RAILROAD GAZETTE

FRIDAY, JULY 28, 1876.

The 'Puffing Billy."

There has recently been held in London an exhibition of "Scientific Instruments" of various kinds, and among them old locomotives and models of locomotives and other objects relating to the early development of railroads in that country. The engraving which we give herewith (which is copied from one in *The Engineer*) is of an engine built in 1813. The following history of this engine is copied from Colburn's Treatise on the Locomotive Engine:

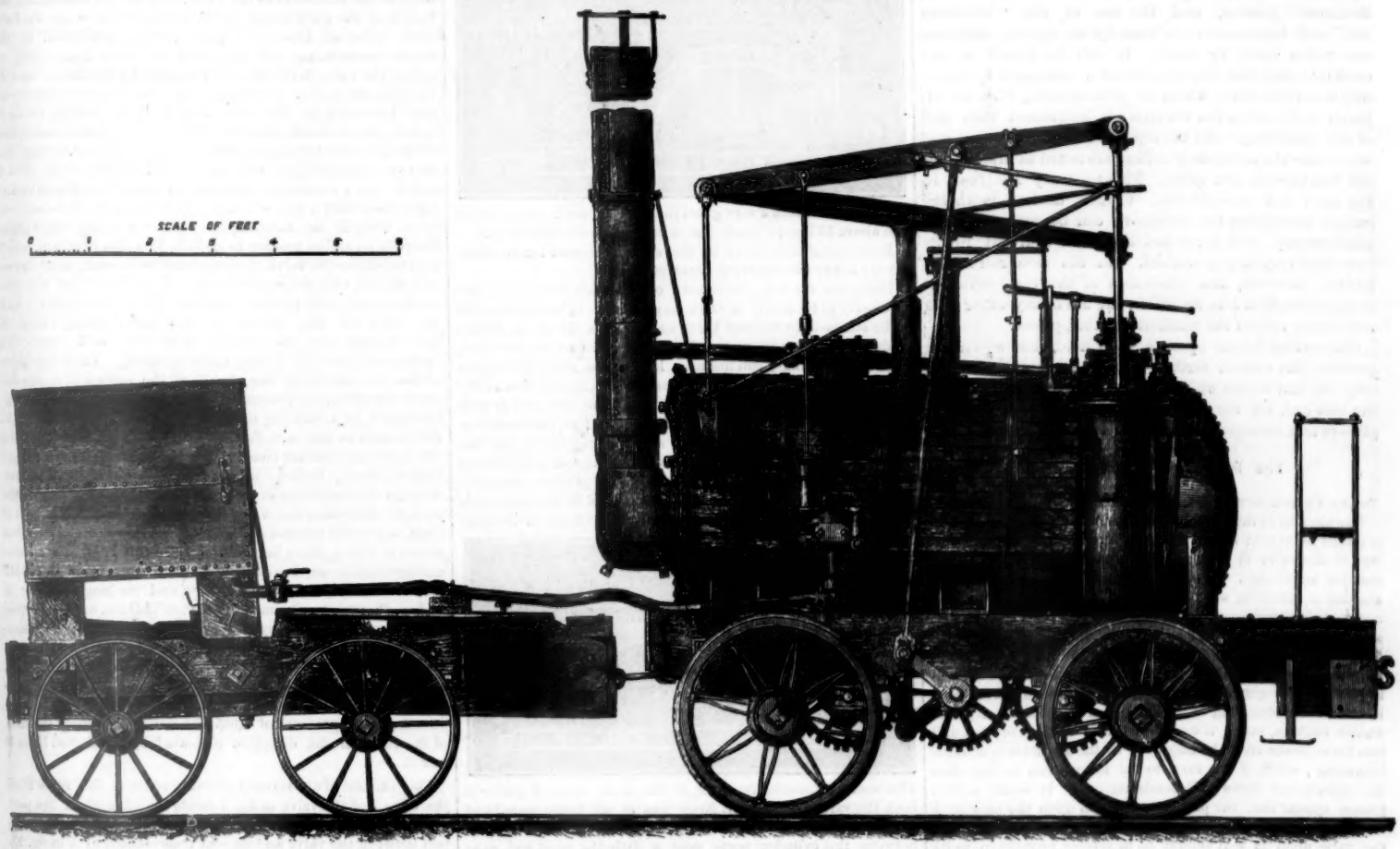
"While Murray's engines, the first ever applied permanently and on a commercial scale to the purposes of railways, were working between Middleton and Leeds, Mr. Blackett, of Wylam, was seeking to make something of the Trevethick engine which he had purchased the previous year. Mr. Blackett's colliery viewer, William Hedley, was the chief mechanical engineer in this attempt. Hedley first endeavored to ascertain whether the ordinary adhesion of the wheels of an engine upon smooth rails would be sufficient to insure the useful application of the whole of the steam tractive force. He experimented with wagons driven by manual power, exerted by cranks and gearing, and he subsequently patented a mode of supporting steam engines upon railway carriages. This patent has been said to cover the use of smooth driving-wheels for locomotive engines, and it has been claimed for Hedley that he was the father of the present system of working locomotive engines by means of the friction between their own wheels and smooth rails. Although Trevethick had already done this, Hedley, acting for Mr. Blackett, was no doubt the first to work up the adhesion of the driving-wheels upon a commercial scale.

* * * * *

"Hedley constructed an engine much upon Trevethick's plan, and which was set to work early in 1813. It had a cast-iron boiler, with a single internal flue, a single cylinder six inches in diameter, and a fly wheel. The engine worked by the adhesion of its driving-wheels upon smooth rails. The boiler was deficient in steaming or evaporating power, and much inconvenience was felt for the want of a second cylinder. The results were such, however, as to encourage Mr. Blackett to commission Hedley to make another and better engine."

This is the engine which is represented in the engraving and which had been deposited in the Patent Office Museum and of which *The Engineer* says:

"It appears to far greater advantage in its present temporary position than it did in its permanent home, where it was so crowded up that it was impossible to get a fair view of it. It was built at Wylam in 1813, or thereabouts, from the designs of William Hedley, and it forms a most interesting link in the history of the locomotive."



THE "PUFFING BILLY."

Locomotive built at Woglam, England, in 1813, *from the design of Mr. William Hedley.*

Contributions.

Permanent Way—Iron versus Steel Rails.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a recent issue of your paper, a correspondent asks for statistical information about the wear of rails on grades and curves, and comments on the lack of accessible information on this subject. As the question of permanent way in several respects is somewhat obscure, any light that can be thrown on any branch of it ought to be welcomed by the profession.

In your issue of June 30 is given a synopsis of a paper which was read before the British Institute of Civil Engineers on the 23d of last May, in which the writer declares that "the life of a rail is entirely a question of tonnage and the speed and frequency of trains." This is altogether too broad an assertion, and would not have been made had the writer been familiar with the history of rail-making. The way in which the rail is made, the shape and the style of joint fastening are all closely connected with its endurance. The author of the above declaration refutes himself in the same paper, for he gives the life of iron rails, on the same road, as wide a margin as from 28 to 2¼ years. While the data he gives may be accepted as accurate, it is certainly worth while to inquire why there should be such an immense difference in the endurance of rails on the same road.

Perhaps a brief statement of facts may give some light on this subject. Before the invention of "three-high" rolls for rolling mills, it was found impossible to completely finish even a short rail 16 to 20 feet long at one heat. Before it could be made smooth and free from rough notches and gaps in the base, it had to be returned to the furnace to be reheated. This last operation gave what is known as a washing or welding heat, and the result was a most excellent, enduring solid iron rail, which could not scale or flake off, and was seldom if ever known to break. When made from a solid bloom of homogeneous iron, the endurance would now be considered astonishing. In this respect, the life of a rail is entirely a question of the mode of making and not at all of quality of metal or of any other consideration.

The introduction of three high rolls lessened the time required to roll a rail one-half, and made it practicable not only to make it 30 to 60 feet long, but to finish it entirely at one heat. Other causes have combined, with the entire absence of inspection, either by any governments or by the railroads, greatly to deteriorate the quality of the iron rails made within the past twenty years. The material has consisted largely of scrap iron and old rails, bought cheap because it could not be otherwise utilized, which was carelessly worked up by the pasting process, into what was called a rail, but which was actually worthless as well as extremely dangerous. Composed of layers of iron, one on top of another, merely stuck together by the process of rolling, without being welded at all, as soon as it was placed in the track the process of disintegration began which may now be seen on any well-worn railroad track, and rail-breaking became an every day occurrence. The various layers of which an ordinary iron rail is composed may separate and break down, so that the rail cannot be used at all in a few months. This has been so often the case as to cause railroad managers to reject iron rails altogether and insist on steel, when the article they purchase as steel is too often nothing of the kind, but is simply the old-fashioned homogeneous iron rail come again, in another and more expensive shape.

The endurance of the old style of rails is indeed remarkable. Thirty-five miles of the iron in the track of the Vicksburg & Meridian road, west of Jackson, Miss., over which the heaviest traffic has always passed, is yet in use, that was laid when the road was first built, more than 36 years ago. The same sort of rails were used between New York and Philadelphia, on the Camden & Amboy road, for 20 years in the main track, and for 20 more in sidings. None of these were ever known to break. Most of these old rails would be considered very light now, none of them weighing more than 45 lbs. to the yard, and many of them only 42 lbs. The writer knows of a number of Western roads where these old light rails are yet in track, perfectly good after 20 to 30 years' constant wear. It will be interesting to collect statistical information of the amount known yet to be in track in the United States. It is certainly very large.

Though at first it was extremely difficult to induce railroad men to use steel rails at all, from the causes above named, they have been led to jump to the opposite extreme and reject iron rails altogether. The quality of steel now used for this purpose is very uncertain; indeed, nearly all the virtues claimed for it properly belonging to well-made iron rails. In fact, it is more than doubtful whether most of the present product is steel at all.

Of course if it is steel, the merits it possesses must be due to the amount of carbon contained in it.

Brande and Mushet, eminent English scientists who have carefully investigated the composition and qualities of steel, declare that to entitle iron properly to be thus called, it must contain from 0.64 to 0.98 per cent. of carbon. With less than this it is simple wrought iron, and when the quantity is much greater it becomes cast iron, which contains it in proportions as high as 7 per cent. The English writer quoted gives the analysis of the metal he examined as containing but 0.320. The quantity here given is so exceedingly minute as to rank this metal among irons rather than steels, for it would be impossible entirely to eradicate all the carbon from the molten mass so that not a trace could be detected. Brande asserts that wrought iron is never absolutely free from carbon.

In 1874 a number of first-class roads reported the increased cost of steel over iron rails to the Illinois Railroad Commissioners to be $35 to $40 a ton, or $3,000 a mile for rails weighing 56 lbs. to the yard.

Is it not worth inquiring whether an equally durable rail cannot be obtained for very much less money? The cost of the old re-heated rail was no greater than the article now furnished, and it is believed that a similar article might now be obtained, if it was wanted, at a price no greater than that charged 25 years ago. The subject is certainly a most important one, and well worth the careful consideration of railroad managers, from an economic point of view. Most undoubtedly from the side of the public and the railroad stockholder is it certain that rails cannot be made too safe and durable, or too cheaply, having in view the other good qualities named.

EXPERT.

[We must protest mildly, in the interest of a fair statement of a metallurgical problem, against portions of our correspondent's letter. An interesting part of the whole question, in one phase at least, turns upon what consumers at large will agree to call "steel," but, in view of the fact that within a month past an international commission has been charged by our own Institute of Mining Engineers with the duty of defining this term, and others kindred to it, we will not venture any complete definition of our own. We believe, however, that all interested will agree that steel, in the "rail" sense—or *rail metal*, as it

may be called—is a kind or grade of metal which has taken on its existing solid, crystalline form from a state of complete fusion, having been brought, by one means or another, to the high temperature which is required for the purpose. We cannot agree with "Expert" that the merits which this metal possesses are due solely to the amount of carbon it contains, or that the quality is very uncertain; we judge that he means that it is *of necessity* very uncertain. If steel scrap of approved quality or old steel rails were to be worked as old iron now are, that is by welding—and men enough have tried to do this—then the result would follow that the bar would go to destruction just as the pasted stock does in the iron rail; but, by starting with a state of *fusion* in the manufacture, this whole series of causes of decay is eliminated entirely, and we urge this fact upon "Expert's" attention in the very judicious consideration he has given to the subject. Any of our steel rail makers will undertake to supply rails, which, in respect of the carbon they may contain, shall not vary more than between the limits of 2¼ and 3¼ tenths of one per cent., and experience has quite amply shown that safety is secured between these limits from compression or bulging on the one hand and from breakage caused by too great hardness on the other.

We urge another consideration, bearing directly upon the cost of the rail, that the steel rail—assuming for the moment the Bessemer process, and the use of the "blooming mill" with large ingots—is made by machinery, while the iron rail is made by hand. It will be found, we are confident, that this is not too broad a statement to make, within certain limits which are quite obvious, when the capacity of the seven-ton converter is contrasted with that of the "puddling," and the top-and-bottom furnaces, and where also the methods of rolling are noted as practised in our best modern rail mills. The tendency has been, in the steel rail manufacture, toward dealing with the largest masses that the machinery can be made to handle continuously, and three-rail and even four-rail ingots have been very largely worked. In the iron rail manufacture, however, the conditions of the case have prevented, except in rare instances, the use of any other than very small, indeed the smallest possible, pieces.

Our correspondent opens a wide field, but we forbear pursuing the subject farther at this moment. We can only say that we are with him in every attempt to urge the best rail, for the money at command, upon our engineers and managers.—EDITOR RAILROAD GAZETTE.]

The Pressure on Slide Valves.

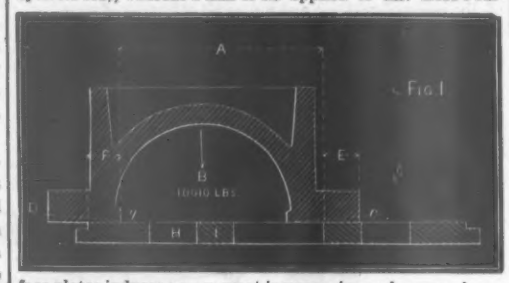
TO THE EDITOR OF THE RAILROAD GAZETTE:

The amount of the pressure with which a common slide valve is forced to its seat by the action of the steam upon the back face of the valve is a subject upon which we have but little definite knowledge. That it is sufficient to absorb a large amount of power in moving valves having a large area, and under high pressures of steam, our daily practice demonstrates, and hence the successful application of balanced valves to marine and other large engines. In the smaller engines, however, the success of balanced valves has not been sufficient to warrant their general employment. No advantage was found to attend the balancing of the valves on the ten-horse power Baxter engines, nor is it considered that engines of that and less horse power are to be improved by the application of valve balancing; while, if we turn to the locomotive, we find that the unbalanced valve still holds its own. It would at first glance appear that the pressure of steam upon the back of a valve remaining equal, the amount of power requisite to move the valve upon its seat should be in precise proportion to its area. Such, however, is not the case, because there are elements to be taken into account, in the case of comparatively small valves, which do not exist in the larger ones, as the following remarks well demonstrate.

If we take a pair of very finely scraped surfaces, having say 96 inches of face area in contact, we shall find that with the atmospheric pressure forcing them together it will require about 20 lbs. at the most to move one laterally upon the other. This is in the proportion of a pressure of 180 lbs. of lateral force to move the valve under a steam pressure of 135 lbs. per inch. But it must be borne in mind that scraped surfaces are nothing more than a series of hills and hollows, from which hollows it is impossible to exclude the air or steam, as the case may be, so that the areas of the hollows act to balance the back surface, and their areas being in the aggregate equal, even in surface plates, to at least one-half of the face area, we have had, hitherto, no means of ascertaining with any degree of certainty what amount of force per inch of area it was necessary to exert to move one surface in closely-fitting contact with another.

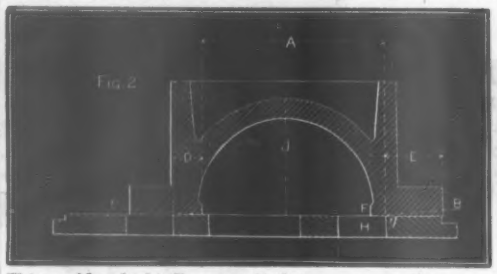
A pair of surface plates got up by Mr. Joshua Rose, of New York, and which are exhibited by the Putnam Machine Company in Machinery Hall at the Centennial, have their surfaces got up by files and emery cloth, so that they are smooth and bright, and the whole of the surfaces being in contact the conditions under which they may be operated one upon the other represent nearly the conditions under which a slide valve may be supposed to act, and under which it would act providing it fitted as perfectly to its seat as do these two plates together. The size of the plates in question is 12 by 8 inches, giving a total area of 96 inches, and it is found that it requires 200 lbs. to pull them apart, or, in other words, that there is between them a vacuum of 2 lbs. per square inch, providing that one surface is placed to exactly cover the other. If, however, we apply to either plate a piece of surfaced iron having an area of about 6 inches, we find that there is between the surface a vacuum of about 5 lbs. per inch of area. This difference is accounted for by the fact that it is impracticable to so exclude the air from between the large, as it is between the small surface, which fact is demonstrated as follows:

If we take one of these plates, and, placing it completely over the other, lower it *upon* the other, the two surfaces do not come together nor will any amount of movement under such pressure as can be placed upon the upper plate by the human body force the air out from between the two surfaces; but if we place a very small area of one plate in contact with the other, and, while pressing the two together, force one horizontally over the other, it becomes difficult to get them together so so that one completely covers the other, the amount of force required being 150 lbs., or about 1⅓ lbs. per inch of area. Now according to these data, a pressure of 130 lbs., instead of the atmospheric pressure, would require 13 lbs. per inch to effect lateral movement of one face upon the other. Upon this basis a locomotive slide-valve of ordinary size, that is, whose dimensions are 16 by 8⅓ inches, would be pressed to its seat with a force equal to 17,680 lbs., and would require 1,360 lbs. to move it upon its seat. Here we may consider the question of lubrication. A film of oil applied to a scraped surface has but little effect upon the force required to give it lateral movement upon its seat, whereas a film of oil applied to Mr. Rose's surface plates induces a very great increase in such power, hence the above 13 lbs. per inch of area represents the minimum.



In applying these facts to the slide valves for locomotives, we are led to the following considerations:

First, how far is it practicable or desirable to make a valve fit closely to its seat? A valve may be made to bed sufficiently to be steam-tight without being so perfect a fit as to induce undue pressure to its seat, and there is good reason to believe that under ordinary conditions a locomotive slide-valve never fits so closely as to induce the pressure due to a surface as flat and smooth, even as a scraped one, let alone that due to such a true, smooth and level one as Mr. Rose has produced, because, scrape a valve face and its seat as true as we may, the steam fills the hollows of the scraper marks and thus relieves the valve of a very large proportion of the pressure due to its area. It would appear that the scraper marks are soon worn down, and hence that the valve then beds perfectly to its seat.



This would undoubtedly occur if the wear upon all parts of both the valve and the seat faces was at all times equal and the conditions constant; but such is not the case. The bridges between the cylinder ports wear a little the most and wear hollow in their lengths for the reason that the wearing surface upon which the valve beds, standing at right angles to the top and bottom of the length of the bridges, are greater and hence suffer less abrasion. Then, again, inequalities in the texture of the metal and other causes in themselves trivial form in the aggregate the causes which operate to prevent the equal abrasion of the seat and valve faces at all parts, and hence it is that when a locomotive comes to be repaired we find those faces worn considerably out of true, as might be expected of the variation in the amount of contact had by different parts of the surfaces, and the irregularity in the speed at which the valve travels while such contact is taking place. Of more consequence than the above considerations, however, is the one that there is every reason to believe that the form of a locomotive slide-valve is continually changing. During the process of the cooling of a casting, after the metal is poured, the surfaces lose their temperature in advance of the internal metal, and their crystaline formation is therefore more rapid; those surfaces therefore assume strength sooner than the inner metal, and therefore resist the strains produced in the cooling and crystaline formation of the latter. There is then upon the surfaces of all castings a tension which is relieved in precise proportion as those surfaces are cut away, thus, as the edges and the face of a valve are planed a re-formation takes place, which throws the face out of true. This we remedy in the surfacing of the valve; but when the valve is placed under steam the increase in its temperature induces a more complete re-formation, so that, surface a valve as true as we may, we find that it does not bed true to its seat when it is first placed under steam, nor, indeed, until it is worn down to a surface, and we have not only evidence of the re-formation, but we have also proof that the pressure on the valve back is insufficient to spring the valve to the conformation of its seat.

If we now turn our attention to the cylinder we find that a large proportion of its surface area has, from the boring and planing, been relieved of its tension, inducing in it also a re-formation, first during its manipulation and secondly when placed under steam, so that scrape up a valve and its seat as true as we may, we cannot hope to make them a sufficiently close fit to keep a vacuum between them when heated to the temperature due to the steam pressure. It would appear, however, that after the re-formation had once completely taken place, the valve would wear so as to fit closely to its seat; but the pressure of the steam and hence the temperature of both the cylinder and the valve are continually changing, not only because of variations in the boiler pressure, but also by reason of the action of the link motion in giving more or less steam to the cylinder. The irregularity of the shape of both the cylinder and the valve causes their expansion and contraction to be irregular under varying temperatures operating to alter the fit of the valve to its seat. The valve, too, as it wears thinner, undergoes continuous change of form, so that it springs more from the pressure due to the steam; and that the spring of the valve is important the following considerations will disclose:

Since the area of the valve over which its exhaust port extends has the steam pressure upon its back without any support from the valve-seat beneath to resist that pressure, the latter operates in a direction tending to use the metal near the edges of the valve exhaust port as the fulcrum off which to spring. In fig. 1, for example, the width upon an ordinary locomotive valve of the line *A*, which represents the nearest together points of resistance (in that position) of the valve-seat to the valve, will be 5⅛ inches, and the length of the ports being, say 14 inches, we have on the back of the valve an area of 77 inches, which multiplied by the steam pressure, say 130 lbs., gives us 10,010 lbs. tending to spring the valve in the direction denoted by the lines *C* and *D*. To resist the action of this pressure we have the area represented in width by the lines *E* and *F*, the length being 16 inches, that is, in all, about 28 inches of area, which multiplied by the pressure 130 equals 3,640, leaving 6,370 lbs. acting, unbalanced, to spring the valve as denoted by the dotted lines *C* and *D*. As a consequence, spring in that direction naturally takes place, and a film of steam gets beneath the faces and extends towards the fulcrum off which the spring takes place. There is no action tending to exclude this film of steam, which acts to relieve the valve of its pressure to its seat, until the return motion of the valve brings the edge *G*, fig. 1, of the valve exhaust port, after passing over the port *A*, into contact with the edge of the bridge *I*, the valve being then in the middle of its travel and so well supported by the seat as not to be very liable to spring. From this point of the valve movement the edge *G* of the valve acts as the fulcrum sustaining the pressure due to the area of the valve unrestrained by a bearing on the valve seat directly beneath it. But so soon as the valve-face at *G* bears upon the bridge, the two come into contact closely, and no film of steam can get between them, because any steam that might find its way through the valve-face at that end would find freedom in the port *H*. But when the valve at that end leaves the port *H* open, say to the amount of the lead, we have the conditions shown in Fig. 2, there being an area on the back of the valve unsupported by any bearing on the seat beneath it, the width of which area at *A* is 4¾ inches and its length being 14 inches, the pressure upon it will be, at 130 lbs. of steam, 8,645 lbs. to resist the tendency of the valve-face to spring, a consequence of this pressure, in the direction of the lines *B* and *C*. We have the area represented in width by the lines *D* and *E*, and the length of those areas being 16 inches their counteracting influence under 130 lbs. pressure will be 2,600 lbs., leaving an unbalanced pressure of 6,045 lbs. acting to spring the face of the valve in the direction indicated by the dotted lines *B* and *C*.

This amount of unbalanced pressure remains the same until the edge *F* of the valve in fig. 2 meets the edge *G* of the port *H*, after which it steadily increases, because the area of contact between the valve and its seat (represented by *E* in fig. 2,) constantly diminishes, until upon arriving at the end of the stroke the conditions again become as shown in fig. 1.

The section of the valve through *J* (fig. 2) being the weakest is the center off which the spring takes place, the face of the valve from the exhaust port outwards being too rigid to give way. The size and form, therefore, of a valve have a great deal to do with its friction to its seat, and herein we may find a solution to much that has hitherto appeared inexplicable.

A valve made weak through the section at *J*, and made sufficiently strong on the lap flanges to resist the pressure without appreciable spring, would be sufficiently free from undue pressure to its seat that no advantage would accrue from the addition of any balancing attachment, especially if its flanges, which are at right angles to the length of the ports, were made thinner at and towards the middle of their lengths.

A valve having thin flanges would (especially if composed of brass, which springs more readily than does cast iron) fit so closely to its seat in consequence of the spring of the flanges themselves as to render a balancing device of decided advantage. These two propositions are made more apparent by supposing the ports to be in the one case covered by a piece of thick, solid iron which has bearing around the edges of the ports only, and hence with steam pressure beneath a large portion of its seating face, and in the other case to be covered by a piece of metal so thin as to bend under the pressure to the conformation of the seat, and therefore with a vacuum beneath it. A valve of large area, such as used for marine engines, will be sure to spring to the conformation of the seat, because of its comparative weakness.

It will perhaps occur to the reader that when the spring of the valve has once taken place the parts of the face in contact will wear away and permit the whole area to bed upon the seat; but the amount of the spring varies with the amount of the steam pressure, hence it is impossible, unless the flanges

of the valves are weak enough to spring of themselves, that the whole face of the valve shall contact with the seat, and the steam beneath acts to balance the valve. It, therefore, the shape and strength of a valve be designed to suit the conditions under which it operates, it becomes sufficiently self-balancing to meet the requirements of the case.

Statistical Information Desired About Iron Rails.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The undersigned will take it as a special favor if persons who know of old iron rails being yet in the track of any railroad will inform him of the mileage, weight, length of service, &c., by postal card or otherwise.

J. F. TALLANT,
Burlington, Iowa.

Mr. Devereux and the Standard Oil Company.

The following appears in the Cleveland *Herald:*

CLEVELAND, O., July 17, 1876.

Eds. Herald: Upon my return to Cleveland from a ten days' absence, in view of my name having been adversely mentioned in connection with certain statements which have recently appeared in various newspapers, may I ask the favor of the publication of the following communication:

On Tuesday afternoon, June 13, at my Cleveland office, I was served by special messenger from the Sergeant-at-Arms of the House of Representatives with a subpœna to appear on the following Friday at the hour of 10 a. m., in the chamber of the Committee of Commerce, at the city of Washington, to give information concerning the oil traffic of the Atlantic & Great Western Railroad.

In the necessary preparation of an impending lawsuit in the Court of Common Pleas at Akron, and with my engagements as Receiver of the A. & G. W. R. R. in connection with said suit, which involved a claim of $2,000,000 against the railroad, it was not possible under the circumstances for me to go to Washington.

The situation was explained to the special messenger, Mr. Isaac T. Moore, and my readiness to attend the wishes of the Committee of Commerce at some more convenient season was frankly stated to him. Further, on the evening of the same day (June 13) the counsel of the Receiver, Messrs. Otis, Adams & Russell, wired Hon. Frank Hereford, Chairman of the Committee of Commerce at Washington, the same explanation which had been made to his officer, Mr. Moore.

The suit at Akron terminated on Friday, June 30. On Monday, July 3, I again met Mr. Isaac T. Moore, the special messenger, on his return from another of his Western trips in the furtherance of the business of the committee, and learned from him that Mr. Hereford had received my explanation and fully accepted the reason which had previously prevented my visiting Washington. I then notified Mr. Moore that I was now free to appear before the committee if they still desired it, but understood from him that in such event the committee would undoubtedly advise me further, but that they were then probably about through with their work.

There rests the matter of my failing to appear before the Committee of Commerce, and I have had no other or further communication from said committee, nor from any of its officials. At no time have I hesitated to appear before the committee, and regret that the opportunity had not been afforded me, and which, undoubtedly, would have obviated the necessity of a certain letter, of which the following is a copy:

"NEW YORK, July 10, 1876.

"SIR: It has come to my notice that in the New York *Tribune*, of Saturday, the 8th inst., it is stated that a Mr. Frank Rockafeller, of Cleveland, O., testified before your Committee that he *believed* that I, with managers of other railroad lines, had been personally receiving a portion of certain drawbacks or rebates upon oil freights said to be paid to the Standard Oil Company.

"In view of this extraordinary evidence, and its publication, it seems proper that I should thus address you. And, in denying the charge, as I now do deny it absolutely and without qualification, I desire also to enter my protest against such attacks being made and made public through a committee of Congress. Very respectfully, your obedient servant,

"J. H. DEVEREUX.

"To Hon. Frank Hereford, Chairman of Committee of Commerce, Washington, D. C."

Permit me to add that, observing in the publications heretofore referred to the statement that Col. O. H. Payne, Treasurer of the Standard Oil Company, had appeared before the Committee of Commerce but had refused to testify, upon reaching Cleveland I at once sent to Colonel Payne a communication upon the subject, and as to my alleged connection with the Standard Oil Company as reported by the newspapers.

That gentleman's reply is as follows, by which it appears he *did* testify and without qualification:

"CLEVELAND, O., July 17, 1876.

"Gen. J. H. Devereux, Receiver A. & G. W. R. R.:

DEAR SIR—I have your communication of this date, and while such evidence cannot be needed where you are known, I beg to say that no money or other consideration has ever been paid or given by the Standard Oil Company, directly or indirectly, to you, or for your benefit, on account of, or in connection with, rebates on oil freights or otherwise, and there is to my knowledge no foundation for such charge, as I have already testified in the most unqualified manner before the Congressional committee at Washington, my testimony applying to all other railroad officials, as well as to yourself. Yours, very truly, "O. H. PAYNE.

"Treasurer Standard Oil Company."

I have some doubt as to the propriety of giving such attention as I have done in this manner to these reckless and willful misstatements touching the honor of myself and other railroad managers. But it concerns so many upon the other side of the water that their property, with which I am intrusted, is properly cared for, that I have thus trespassed on your space.

Very respectfully yours, J. H. DEVEREUX.

Prussian Standards for Uniform Rolling Stock.

The *Journal* of the Society of German Engineers publishes a summary of a communication read before the Bavarian Chapter of that Society by Mr. Stambke, last October, on "Standards for Railroad Rolling Stock," which we translate as follows, for the readers of the *Railroad Gazette:*

The writer said that in spite of the political divisions of Germany at the time of the construction of the first railroads (and perhaps, indeed, by reason of these divisions) the construction of German rolling stock has, for a long time, followed uniform standards. The German Railroad Union has what are called "Technical Regulations," prepared by its technical officials, which stand in high repute as a technical law-book with all technical officers of railroads, and in great part must be followed as obligatory rules. However, within the limits of these technical regulations, great discretion is left to each constructor, so that there exists a great variety in the details of the rolling stock of the different roads. Every road laid stress on the greatest possible uniformity in its own rolling stock, since every change resulted in considerable expense in the furnishing of spare parts and incurred other difficulties.

RAILROAD EARNINGS IN JUNE.

Name of Road.	Mileage. 1876.	1875.	Inc.	Dec.	Per c.	Earnings. 1876.	1875.	Increase.	Decrease.	Per c.	Earnings per Mile. 1876.	1875.
Atchison, Topeka & Santa Fe	711	508	203	.....	40.2	$187,331	$103,886	$83,445	.....	80.3	$263	$205
Atlantic & Pacific	328	328	.....	.....	.....	106,600	97,100	9,500	.....	9.8	325	296
Baltimore & Ohio	1,462	1,462	.....	.....	.....	1,313,012	1,519,547	.....	$206,535	13.6	898	1,039
Cairo & St. Louis	146	146	.....	.....	.....	23,986	25,652	.....	1,666	6.5	164	176
Canada Southern	452	452	.....	.....	.....	111,008	96,599	14,409	.....	15.0	246	214
Central Pacific	1,315	1,293	22	.....	1.7	1,639,000	1,738,370	.....	99,370	5.7	1,246	1,344
Chicago & Alton	650	650	.....	.....	.....	441,390	382,233	59,157	.....	15.5	679	588
Chicago, Milwaukee & St. Paul	1,400	1,399	1	.....	.....	877,571	742,168	135,403	.....	18.2	627	530
Chicago & Northwestern	1,499	1,499	.....	.....	.....	1,237,853	1,052,890	184,963	.....	17.6	826	702
Chicago, Rock Island & Pacific	699	674	25	.....	3.7	714,005	676,082	37,923	.....	6.6	1,021	1,003
Cincinnati, Lafayette & Chicago	75	75	.....	.....	.....	30,568	31,297	.....	729	2.3	408	417
Denver & Rio Grande, Main Line	120	120	.....	.....	.....	34,626	35,329	.....	703	2.0	289	294
Illinois Central	1,109	1,109	.....	.....	.....	614,484	602,505	11,979	.....	2.0	554	543
Indianapolis, Bloomington & Western	344	344	.....	.....	.....	129,090	82,238	46,852	.....	57.0	375	239
International & Great Northern	459	459	.....	.....	.....	66,407	75,374	.....	8,967	11.9	145	164
Kansas Pacific	784	761	23	.....	3.0	238,437	277,783	.....	39,346	14.2	304	365
Michigan Central	804	804	.....	.....	.....	533,170	484,447	48,723	.....	10.1	663	603
Missouri, Kansas & Texas	786	786	.....	.....	.....	233,126	221,444	11,682	.....	5.3	297	282
Nashville, Chattanooga & St. Louis	342	342	.....	.....	.....	118,562	102,102	16,460	.....	16.1	347	299
Ohio & Mississippi	615	615	.....	.....	.....	304,846	256,772	48,074	.....	18.7	496	418
Philadelphia & Erie	288	288	.....	.....	.....	261,265	287,158	.....	25,893	9.0	907	997
St. Louis, Alton & Terre Haute—Belleville Line	71	71	.....	.....	.....	37,178	36,315	863	.....	2.4	524	512
St. Louis, Iron Mountain & Southern	685	685	.....	.....	.....	262,300	294,631	.....	32,331	11.0	383	430
St. Louis, Kansas City & Northern	504	504	.....	.....	.....	228,720	178,333	50,387	.....	29.4	454	354
St. Louis & Southeastern	349	349	.....	.....	.....	90,184	65,083	25,101	.....	38.6	258	186
St. Paul & Sioux City	122	122	.....	.....	.....	53,748	43,184	10,564	.....	24.5	441	354
Sioux City & St. Paul	148	148	.....	.....	.....	31,866	22,605	9,263	.....	41.0	215	152
Toledo, Peoria & Warsaw	237	237	.....	.....	.....	135,928	77,963	57,965	.....	74.3	573	329
Totals	16,504	16,230	274	.....	.....	$10,066,263	$9,609,090	$872,713	$415,540	.....	$610	$592
Total increase	.....	.....	274	.....	1.7	.....	.....	457,173	.....	4.8	.....	.....

RAILROAD EARNINGS, SIX MONTHS ENDING JUNE 30.

Name of Road.	Mileage. 1876.	1875.	In.	Dec	Per c.	Earnings. 1876.	1875.	Increase.	Decrease	P.c.	Earnings per mile. 1876.	1875.	Inc.	Dec.	P.c.
Atchison, Topeka & Santa Fe	684	508	176	....	34.6	$1,040,165	$572,640	$467,525	.....	81.6	$1,519	$1,127	$392	.....	34.8
Atlantic & Pacific	328	328	....	.....	.....	611,298	562,751	48,547	.....	8 6	1,864	1,716	148	.....	8.6
Cairo & St. Louis	146	131	15	....	11.5	124,068	123,519	549	.....	0.4	850	943	.....	$93	9 9
Canada Southern	452	452	....	.....	.....	832,881	517,949	314,932	.....	60.8	1,843	1,146	697	.....	60.8
Central Pacific	1,315	1,293	22	....	1.7	7,901,000	7,910,183	.....	$9,183	0.1	6,008	6,118	.....	110	1.8
Chicago & Alton	650	650	....	.....	.....	2,237,009	2,112,966	124,045	.....	5.9	3,442	3,251	191	.....	5·9
Chicago, Milwaukee & St. Paul	1,400	1,399	1	....	.....	3,960,185	3,392,441	567,744	.....	16.7	2,829	2,425	404	.....	16.7
Cincinnati, Lafayette & Chicago	75	75	....	.....	.....	189,668	186,544	3,124	.....	1.7	2,529	2,487	42	.....	1.7
Denver & Rio Grande, Main Line	120	120	....	.....	.....	197,195	173,645	23,550	.....	13 6	1,643	1,447	196	.....	13.6
Houston & Texas Central	507	507	....	.....	.....	1,290,328	1,071,249	219,079	.....	20.5	2,545	2,113	432	.....	20.5
Illinois Central	1,109	1,109	....	.....	.....	3,548,601	3,486,076	62,52?	.....	1.8	3,20	3,143	57	...	1.8
Indianapolis, Bloom. & West'n	344	344	....	.....	.....	769,531	597,487	172,04	.....	28.8	2,237	1,737	500	.....	28.8
International & Gt. Northern	459	459	....	.....	.....	567,947	590,096	.....	22,149	3.8	1,237	1,286	.....	49	3.8
Kansas Pacific	772	761	11	....	1.4	1,362,10	1,492,664	.....	130,562	8.7	1,764	1,961	....	197	10.0
Michigan Central	804	804	....	.....	.....	3,465,484	3,195,038	270,44?	.....	8.5	4,310	3,974	336	.....	8.5
Missouri, Kansas & Texas	786	786	....	.....	.....	1,417,840	1,229,015	188,825	.....	15.4	1,804	1,564	240	.....	15.4
Nashville, Chattanooga & St. L.	342	342	....	.....	.....	876,636	763,808	112,828	.....	14.8	2,560	2,233	327	.....	14.8
Ohio & Mississippi	615	541	74	....	13.7	1,847,769	1,589,064	258,705	.....	16 3	3,005	2,939	66	.....	2.2
Philadelphia & Erie	288	288	....	....	.....	1,565,721	1,462,371	103,350	.....	7.1	5,437	5,078	359	.....	7.1
St. Louis, Alton & Terre Haute, Belleville Line	71	71	....	.....	.....	234,072	278,068	.....	44,014	15.8	3,297	3,917	.....	620	15.8
St. Louis, Iron Mt. & Southern	685	685	....	.....	.....	1,729,043	1,642,949	86,094	.....	5.2	2,524	2,398	126	.....	5.2
St. Louis, Kansas City & North'n	504	504	....	.....	.....	1,500,285	1,235,342	264,943	.....	20.6	2,977	2,451	526	.....	20.6
St. Louis & Southeastern	349	349	....	.....	.....	507,167	479,265	27,902	.....	5.8	1,453	1,373	80	.....	5.6
St. Paul & Sioux City	122	122	....	.....	.....	261,938	198,212	63,726	.....	32.0	2,147	1,625	522	.....	32.0
Sioux City & St. Paul	148	148	....	.....	.....	162,314	104,159	58,155	.....	55.8	1,097	704	393	.....	55.8
Toledo, Peoria & Warsaw	237	237	....	.....	.....	693,365	420,415	263,960	.....	61.5	2,926	1,812	1,114	.....	61.5
Totals	13,312	13,013	299	....	.....	38,893,612	35,396,934	$3,702,586	$205,908	.....	$2,922	$2 720	$202	.....	7.4
Total increase	.....	.....	299	....	2.3	.....	.....	3,496,678	.....	9.9	.....	.....	.....	.....	.....

The introduction of the metrical system gave opportunity to many roads to remodel their rolling stock. The Prussian Minister of Commerce on that account held that the time had come for the different State railroads of Prussia to introduce greater uniformity in their cars. In November, 1871, a numerous commission appointed for this purpose met and fixed upon the most important forms of construction for freight cars. Among other matters, the exact dimensions of the tires, axles, wheels, springs, buffers, profile irons, and the length, breath and wheel-base of the cars, etc., were agreed upon. These regulations were most heartily welcomed by the manufacturers, who were thereby enabled to work on stock not yet ordered.

The extensive railroad constructions which Prussia was then engaged in gave the Minister of Commerce opportunity to intrust to the management of the Lower Silesian and Maerk Railroad, with the assistance of the mechanical engineers of the other State railroads, the determination of standards for the locomotives, passenger cars, etc., of these new extensions, which then would come in force for those supplied for the old State railroads.

The Commission called for this purpose accomplished its task in three sittings, each lasting about three days, and have already received the ministerial approval of the resolutions adopted at the first meeting in June, 1875, so that the further sittings could be devoted to working out the details in accordance with these first resolutions.

From the very comprehensive report which has appeared in print, the following is selected:

PASSENGER CARS.

The advantages and disadvantages of the intercommunication (American) system in comparison with the coupe (English) system were thoroughly discussed, and it was decided that for local traffic all first, second, third and fourth class cars should be four-wheeled and provided with means of intercommunication. For through traffic in fast trains, however, coupe cars with four and six wheels were considered more suitable, and it was further held that extensive experiments should be made with passenger cars having an inclosed side passage (Heusinger's system).

The leading dimensions of every kind of car—length, breadth, height, wheel-base, longitudinal divisions, etc.—were fixed upon, and the necessary arrangement made for a suitable water-closet.

Similar determinations were made with regard to baggage cars, while special cars for any peculiar transportation, such as timber, boilers, rails, etc., can be made suitable to the needs of each locality.

LOCOMOTIVES.

The regulations for the construction of locomotives appeared more difficult, and the need for them less, since for the most part these remain on the same road and can be suited to its grades and curves. However, it was found possible to settle upon general regulations for these. A beginning was made by comparing the newest forms of construction, and this resulted in great unanimity with regard to the systems chosen, but difference in almost all details, though often within very narrow limits.

First it was agreed not to adopt too heavy locomotives, and rather to run smaller trains; and further that the engines should be made as simple as possible. The steam pressure was fixed at 150 lbs., the boiler constructed with no elevation of the barrel above the fire-box (wagon top), and a larger grate surface given it corresponding to the consumption of coal. The barrel of the boiler to rest directly over the fire-box, and fastened to its horizontal crown-sheet by means of vertical riveted stay-bolts.

It was resolved to construct only one kind of locomotive for express and ordinary passenger trains, while special forms of construction are necessary for freight trains. In both kinds the frames are placed inside of the wheels, the steam cylinders horizontal and outside. The valve-gear may be either inside or out, and in both cases of the Allan system. The passenger locomotives have a 14 ft. 5½ in. wheel-base, and the back coupled axle is placed under the fire-box. On mountain roads the forward axle may be movable. The diameter of driving-wheel inside of the tire is 5 ft. 3¼ in., the diameter of the cylinder, 16¾ in., the stroke, 22½ in.

In freight locomotives all three of the coupled axles are under the boiler barrel, with 11 ft. 2 in. wheel base. The diameter of driving-wheel inside of tire is 3 ft. 11¼ in.; cylinders, 18 in. diameter and 25 in. stroke. For the details of each of the two chief kinds, 245 dimensions were agreed upon; these relate to boilers, frames, wheels, tires, cylinders, positions of these with regard to each other, valve openings, valve gear, guides, crossheads, pistons, foot-board, tender, etc.

It cannot be denied that rules so general as these exclude, for the sake of uniformity, many other approved methods of construction. In order not to fall behind the times, it was determined to have these regulations revised periodically.

Name Boards of Stations.

The following suggestion of a correspondent of the *English Mechanic* is recommended to the attention of railroad men in this country:

"Much trouble would be saved if authorities in England would do as in Belgium—post up the name of the station in a conspicuous place at each end of the premises, on some blank wall at right angles to the line of rail. Abroad I used often to put out my head and read the name, at the distance of a quarter of a mile or more, on the gable perhaps of a railway shed or platelayer's cottage, whereas here on some lines you must carefully watch your opportunity (perhaps incommoding passengers next the windows) to catch a hasty sight of a name-board fixed up parallel to the rails. If the train be long or line curved, one may have to 'bother a porter' after all. Nothing is more common than to hear from a fellow-passenger 'Can you tell me what station this is?' More than once I have known the question asked just too late; the train was moving, and the bewildered traveler must wait at the next station for a return train. On some lines the porters either do not 'sing out,' or disguise the name by local pronounciation."

Waiting for Opposite Train.

The Aurora (Ill.) *Beacon* of July 19 says:

"In the fog of Tuesday night, Meeks and Austin each sidetracked his train at Sugar Grove (where there is no telegraph office,) and patiently waited for three mortal hours for each other to pass, before discovering that a box car was standing between them, causing each to suppose that the other's headlight was but the distant glimmer of a switch lamp!"

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Editorial Announcements.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

NEW YORK GRAIN RECEIPTS.

We have followed with unusual care the course of the grain movement since railroad rates were reduced and navigation was opened, noting the shipments from the Northwestern markets by lake and by rail, and the receipts at the different Atlantic ports. These are especially interesting now because the reduction of rates, though not made for that purpose, gives an opportunity which never before occurred to ascertain how far a diversion of the grain traffic from the lake and canal to the rail routes is practicable; and, again, because it is important to know the effect of extraordinarily low rail rates on the business of the different seaports, the more so because it is supposed that the rates were reduced because there had been extraordinarily large receipts at Baltimore and it was feared that business was being diverted from New York.

Another question of interest is the division of the traffic among the different routes. Statistics of the receipts of each route are preserved by the New York Produce Exchange, and a summary of them for the six months ending with June is given below.

The receipts of grain of all kinds at New York, then, for the first half of the year, have been by each route, for three years, in bushels:

Railroads:	1876.	1875.	1874.
Pennsylvania	1,716,456	2,769,235	5,006,177
New York Central	9,319,441	8,139,569	10,491,622
Erie	7,746,313	6,856,261	10,495,743
Other roads	197,707	207,371	246,843
Total by rail	19,025,231	17,972,436	26,236,385
Water:			
North River boats from N. Y. Central at Athens	2,544,500		
Other North River boats	8,575,324	5,286,078	13,109,690
Coastwise	1,619,818	463,218	396,682
Total by water	12,739,642	5,749,296	13,506,372
Total by rail and water	31,764,863	23,721,732	39,742,757

The percentage of the whole received by each route each year was:

Railroads:	1876.	1875.	1874.
Pennsylvania	5.4	11.6	12.6
New York Central	29.4	34.4	26.4
Erie	24.5	28.9	26.4
Other roads	0.6	0.9	0.6
Total by rail	59.9	75.8	66.0
Water:			
North River from N. Y. Cen. at Athens	8.0	....	....
Other North River boats	27.0	22.3	33.0
Vessels coastwise	5.1	1.9	1.0
Total by water	40.1	24.2	34.0

That is, in 1874 the railroads brought to New York two-thirds of its grain receipts; in 1875, three-quarters; in 1876, three-fifths. This does not look like rapid progress in diverting traffic from the water route; but the appearance is deceitful, because in 1875 the canal was not open in time to permit any deliveries worth noting until June, while May receipts by the North River this year were 4,000,000 bushels, and moreover there was a more active winter movement in 1874 than in 1876. The receipts each month by rail and water have been:

		1876.	1875.	1874.
Jan..	Rail	3,334,350	2,705,786	4,407,375
	Water	401,787	36,275	147,744
Feb...	Rail	2,244,106	3,638,303	5,031,073
	Water	259,814	193,462	194,718
Mar..	Rail	2,930,846	2,648,810	2,823,306
	Water	490,117	141,359	61,500
April.	Rail	2,374,614	2,677,109	5,745,238
	Water	832,579	51,103	121,143
May..	Rail	4,249,418	3,776,398	4,413,088
	Water	5,578,233	210,153	5,344,044
June..	Rail	3,891,897	2,526,031	3,816,305
	Water	5,247,112	5,116,944	7,635,223
6 mos.	Rail	19,025,231	17,972,436	26,236,385
	Water	12,739,642	5,749,296	13,506,372
Total rail and water		31,764,863	23,721,732	39,742,757

The water receipts, it is seen, are almost entirely in May and June; but last year they were almost entirely in June, the canal being closed for repairs nearly all the month of May. If we compare the periods of open canal navigation, that is, May and June in 1874 and 1876 and June only in 1875, we find that the railroads in those periods delivered 37½ per cent. of the grain in 1874, 36 per cent. in 1875 and 43 per cent. in 1876. This more truly represents the progress in railroad receipts at New York.

Again looking at the upper table—that showing receipts by different routes—the chief change noticeable in the receipts by rail is the great decrease in the proportion arriving by the Pennsylvania Railroad. That line delivered 12.6 per cent. of the total New York receipts in 1874 and 11.6 per cent. in 1875; this year but 5.4 per cent. The changes in the proportions by the other routes are not considerable. Taking the gross amounts even, without reference to proportions, we find that in a year when New York received one-third more than the previous year, the Pennsylvania Railroad brought it a third less. The grain carried by this road, it seems, has gone this year to an extent hitherto unknown to Philadelphia and Baltimore.

Comparing the proportions received by railroad to the total received by rail, we have the following as the relative rank of the railroads as grain carriers to New York:

	1876.	1875.	1874.
New York Central	49.1	45.3	40.0
Erie	40.9	38.2	40.0
Pennsylvania	9.0	15.4	19.1
Other roads	1.0	1.1	0.9
Total	100.0	100.0	100.0

The New York Central & Hudson River has thus steadily improved its position, the Erie has been nearly stationary, while the Pennsylvania, which formerly brought nearly a fifth of the rail receipts, during the last half-year brought an eleventh.

The New York Central, moreover, this year, in addition to the 29.4 per cent. of the total receipts which it brought in cars, carried 8 per cent. from Lake Erie to Athens (320 miles) and delivered it in barges on the North River, only the last 100 miles being by water.

Another inquiry of special interest to the great carriers and to the seaboard merchants at the present time is whether New York receives an advantage over competing ports by the maintenance of very low rail rates, as it is understood that its grain traffic was quite seriously threatened last winter by diversions to Philadelphia and Baltimore. A study of the returns of the weekly receipts at the different ports by both rail and water for the half-year will furnish material for the answer to this inquiry.

Aside from New York, there are no appreciable receipts by water except at Montreal and New Orleans. The total Montreal and New Orleans receipts for the half-year were 8,049,727 bushels. Adding these receipts (some small part of which was doubtless by rail) to the New York water receipts, we have 20,789,369 bushels as the total water receipts at all Atlantic ports for the half-year, and 57,043,563 as the total rail receipts. All but 2,591,459 bushels of the water receipts arrived after April 22; and if we divide the receipts by rail and by water for the periods before and after this date of April 22, we have

	By rail.	By water.	Total.
Jan. 1 to Apr. 22	30,733,883	2,591,459	33,325,342
Apr. 23 to July 1	26,309,680	18,197,910	44,507,590
Total	57,043,563	20,789,369	77,832,932

New York receipts for these same periods have been:

	By rail.	By water.	Total.
Jan. 1 to Apr. 22	10,024,856	1,746,795	11,771,651
April 23 to July 1	9,000,375	10,992,847	19,993,222
	19,025,231	12,739,642	31,764,873

Now, though it is true that during the latter period, while rail rates were very low, the New York receipts were 44.9 per cent. of the *total*, while they were but 35⅓ per cent. for the previous period, we will by no means be justified in the conclusion that this increase in the New York proportion has been due to the low rail rates. There have been two great influences affecting shipments and their course: one, the reduction of rail rates; the other, and a much more powerful one, the opening of navigation. Evidently if the low rail rates had tended to direct grain shipments from the other ports to New York, the effect would be seen in a greater proportion of *rail* receipts since the reduction. The above figures enable us to make the comparison, and we find that New York receipts of grain of all kinds were:

32.61 per cent. of all *rail* receipts before April 23, and
33.07 per cent. of all rail receipts after April 22,

being 33.35 per cent. for the whole six months. So slight a change as this is, of course, equivalent to none, and we are justified in concluding that the low rail rates and the railroad war have had no appreciable effect on New York grain receipts different from that on the whole grain traffic. New York received on the average a third of the grain carried by rail to the Atlantic before the reduction of rates; it has received one-third since. Its proportion of the *total* receipts has increased largely (from 35½ to 45 per cent.); but this has been wholly due to the fact that it has a monopoly of the vast shipments by the Erie Canal and the Hudson River. It is not easy to see that the rail rates since April have been any more favorable to New York than those of the first four months of the year, and it is almost certain that it would lose rather than gain if the current low rates were maintained through the winter. The inevitable result would be that the winter shipments, wholly by rail, would be much greater than heretofore, of which, as this year's operations indicate, New York would get one-third; thus leaving a smaller amount to go forward by the canal, of which New York gets the whole. This should be evident. Whatever advantage New York has had, by reason of the Erie Canal, it will lose whenever (if ever) rail rates are always as low as canal rates. The city is interested in having the channels of its traffic cheaper than those to any other seaport. This is its peculiar interest, however, not shared by other cities, seaboard or inland, nor by the country at large, which will doubtless be better served if the transportation facilities to the different ports are so nearly equal as to cause a competition among markets. New York will do its work better and cheaper probably if it becomes necessary to make great exertions to prevent the diversion of its business to Philadelphia and Baltimore.

PERSONAL DUPLICATION.

One of the first lessons learned by a person who achieves even very slight distinction in any occupation or calling is the importance of duplicating himself, and increasing the productiveness of his labor by getting others to work for him. A mechanic who gets more work than he can do hires a journeyman to help him, then others, until finally it is necessary for him to stop working himself and devote all his time to directing others. If his business continues to increase, there are still other steps. If, for example, our mechanic is a machinist, he will soon find that he may be obliged to give his time to designing the machines, and intrust to another the practical construction, and finally it may be necessary to have others make the designs and he may devote himself entirely to exercising a general supervision over all. Or take the case of a railroad. We have heard of roads on which one man acted as superintendent, conductor, agent, and was almost literally "all hands." On such roads the process referred to is, that first some one is employed as conductor, another for agent, one or two men are employed to repair the road and another to keep the rolling stock in repair, and the chief devotes himself to a general supervision of all.

This soon reaches a limit, and if the business of the road increases it is necessary to employ more men in each of these departments, then a foreman over each of the latter. If the road is extended, separate gangs of men, each with a foreman, are required, so that a general foreman or "master mechanic" is needed. This process goes on and one branch of authority after another is delegated to others, the president or general manager retaining only a supervision over all.

Notwithstanding this, the almost universal report is that railroad managers are overworked, and the want of time is one of the most serious difficulties in the way of good and intelligent management of most railroads. Persons often express surprise that certain reforms are not carried out, and that those in authority do not see evils which are so very apparent to others. The fact is that the capacity of a person for seeing is a limited quantity, as many have learned, perhaps to their surprise, at the Centennial recently. A railroad manager cannot get more than twenty-four hours out of a day, and only a small fraction of that time can be devoted to the actual consideration or transaction of business.

Another great obstacle in the way of accomplishing much is the fact, as expressed by a favorite writer, that "no sooner does a man attain to any eminence, in whatever calling it may be, than he is forthwith molested by constant demands upon the time which should be reserved to maintain that eminence, and to make it useful to the world."

The executive officers of railroads are beginning to un-

derstand this, and to guard against it have, in most cases, made themselves inaccessible to those whose business is of little importance. Prominent railroad officers have cars fitted up, so that they serve as offices, dormitories, kitchens and dining-rooms. They eat, sleep, and conduct business, as it were, on the wing. And yet if we compare the work accomplished by even our most distinguished railroad kings with that which is done by some of the leading English public men, it seems as though the latter must have some secret of utilizing their time which somehow our men have not yet learned. It was remarked recently that English statesmen write books, which Americans do not. Disraeli wrote a novel while actively engaged in state craft which the whole world read and talked about, and Gladstone published a commentary on a theological book which both preachers and laymen read and pondered. Now imagine Mr. Garrett writing a novel, Mr. Scott an essay on theology, or Vanderbilt publishing a poem. Neither Gladstone nor Disraeli were regarded as less efficient in the high offices they filled because of their literary tastes, and yet we believe that if any prominent railroad president in this country should write and publish a novel, it would be regarded by very many as evidence of his unfitness for his office. Now what is the secret which the Englishmen have which enables them not only to accomplish their work as statesmen but leaves them leisure for literary work? We believe it lies in their capacity to duplicate themselves not only in delegating their work to others, but in utilizing the intelligence of others in collecting information, in making investigations, and finding out and indicating what needs to be done—in other words, by duplicating their minds, as far as that is possible. The way in which this may be done is illustrated in Bulwer's novel, "The Caxtons." In this the hero occupies the position of private secretary to Mr. Trevanion, a member of Parliament. The manner in which he is employed is thus described:

"Take a day for a sample. Trevanion gets up at eight o'clock; at half-past nine he comes into his study. By that time he expects to find done by his secretary the work I am about to describe.

"On coming home, or rather before going to bed, it is Mr. Trevanion's habit to leave on the table of the study a list of directions for the secretary. The following, which I have taken at random from many I have preserved, may show their multifarious nature:

"'1. Look out in the Reports—Committee House of Lords for the last seven years—all that is said about the growth of flax—mark the passages for me.

"'2. Do. do.—"Irish Emigration."

"'3. Hunt out second volume of Karnes's History of Man, passage containing "Reid's Logic"—don't know where the book is.

"'4. Write the four letters in full from the notes I leave, *i. e.*, about the Ecclesiastical Courts.

"'5. Look out Population Returns—strike average of last five years (between mortality and births) in Devonshire and Lancashire.

"'6. Answer these six begging letters; 'No'—civilly.

"'7. The other six, to constituents—'that I have no interest with Government.'

"'8. See, if you have time, whether any of the new books on the round table are not trash.

"'9. I want to know all about Indian corn.

"'10. Set right the calculation I leave on the poor rates; have made a blunder somewhere.'

"At half-past nine Mr. Trevanion comes in with a bundle of letters. Answers to half the said letters fall to my share. Directions verbal, in species of short-hand talk. While I write, Mr. Trevanion reads the newspapers—examines what I have done—makes notes therefrom, some for parliament, some for conversation, some for correspondence; skims over the parliamentary papers of the morning, and jots down directions for extracting, abridging and comparing them with others, perhaps twenty years old. At eleven he walks down to a committee of the House of Commons—leaving me plenty to do—till half-past three, when he returns."

Now, although this is from a novel, it is yet probable that it is something more than a mere imaginary narration of the duties of such a secretary. It is, of course, the almost universal practice of railroad managers to employ a private secretary, but the duties of such persons are usually simply, or at least very little more than, those of an amanuensis. The sort of service which is described above, and which is referred to in this article, is not only such as would be employed in carrying out the ideas and opinions of the chief executive, but which would aid him in acquiring the requisite information to arrive at sound and wise conclusions. It would not require a very active exercise of the imagination to conceive of a list of inquiries or memoranda analogous to those given above, but having reference to railroad business, such as the following:

"1. Look up annual reports of previous ten years and compile therefrom the amount of building stone carried each year.

"2. Do. do., number of emigrants.

"3. Hunt up and mark testimony in printed report of —— patent case referring to —— brake patent.

"4. Write the four letters in full from notes left, *i. e.*, about the proposed bridge over —— river.

"5. Look up rate of increase of population in counties through which our line passed during the last thirty years, comparing population in 1860 with 1870.

"6. Answer the six letters begging for free passes; "No"—civilly.

"7. The other sixteen, that there are at present no vacancies on our road.

"8. Make up a statement of amounts of fuel purchased each year during the past ten years and in parallel columns the number of cars hauled one mile each year, and if possible get same information from the —— & —— Railroad Company."

Such inquiries might be extended indefinitely, many of them involving much more important information than that indicated, and there would be many subjects which it is of course impossible to anticipate. Herbert Spencer in preparing his great work on Biology has employed a number of persons to collect and tabulate the data which are to form the foundation of the book, this labor being vastly greater than could be performed by one person. It begins to seem as though the writing of a certain kind of books will hereafter be the result of the co-operative labor of a number of persons, owing to the immense field of research which human knowledge has opened to us.

What we have ventured to recommend here to railroad managers is some method of duplicating the intelligence which must perform the mental labor becoming so overwhelming to many of them. It is perhaps not a very easy matter to find persons well qualified for such service, but probably judicious inquiry and selection would soon discover persons with the requisite ability.

In commenting on the "want of time for statesmanship," one of the remedies proposed by a writer on this subject, was "to provide, in every department, some person, or persons, who shall not be absorbed by the current business of the department—who should not be concerned so much with what is being done, as with what should be done, and with what should be provided for in the future."

Such a person in the confidence and having the ear of the chief executive of a railroad, and not oppressed constantly with that feeling, which overwork engenders, of the necessity to escape doing what is not absolutely necessary, might examine into things for which the chief has not the time, nor that calm spirit of deliberation which is often needed more than impetuous energy in setting things right.

Some person, it is forgotten who, wished that there were two of himself, so that when one got tired or sick he could lay it aside to recuperate and he could then assume the other. What we have suggested is that railroad managers should aim to have the use of the faculties of two persons as nearly as the limitation of our existence will permit, and that they should duplicate the work of their brains as well as of their hands by employing intelligent and educated persons to do what they cannot find time or have not energy enough left to do.

The Grain Movement for Twelve Weeks.

The shipments of grain of all kinds from the eight principal Northwestern markets for each week since April 22 have been, in bushels, by lake and by rail:

Week ending—	By lake.	By rail.	Total.	Per ct. by rail.
April 29	1,634,541	2,072,946	3,707,487	56
May 8	2,445,191	2,292,633	4,737,824	48½
" 13	1,538,526	2,302,940	3,841,466	60
" 20	1,602,170	2,016,304	3,618,474	55¾
" 27	1,747,408	1,820,456	3,567,814	51
June 3	2,412,162	1,797,922	4,210,084	42¾
" 10	2,894,915	2,147,670	5,042,585	42½
" 17	2,921,405	2,391,811	5,313,216	45
" 24	2,728,706	2,198,054	4,926,760	44¼
July 1	1,821,155	1,784,548	3,605,703	49¾
" 8	1,765,010	1,205,184	2,970,194	40⅝
" 15	1,648,508	1,228,678	2,877,186	42⅝
Total for 12 weeks	25,159,697	23,259,146	48,418,843	48

The movement for the last week show a continuation of the decrease, and the total is the smallest of the season. Compared with the previous week, the decrease is 116,500 bushels, but the rail shipments increased 23,500 bushels, though the difference in favor of water rates was greater that week than before since rail rates were reduced.

The receipts at Atlantic ports for the same twelve weeks have been:

	Corn.	Per cent. of total.	All grains.	Per cent. of total.
New York	7,358,353	27.5	24,751,912	46.5
Boston	2,801,075	10.4	3,864,399	7.3
Portland	208,500	0.8	510,270	0.9
Montreal	1,207,421	4.5	5,098,478	9.6
Philadelphia	7,283,200	27.2	9,846,150	18.5
Baltimore	6,761,500	25.2	7,584,185	14.3
New Orleans	1,178,145	4.4	1,536,983	2.9
Total 12 weeks	26,798,194	100.0	53,192,377	100.0

During the last week (ending July 15), New York received 54 per cent. of the corn, Baltimore 19 per cent., Philadelphia 18 per cent. Of all grains New York received 62 per cent., Philadelphia 12 per cent., Baltimore 10¾ per cent., Montreal 8 per cent., Boston 3⅓ per cent.

The corn receipts at New York are by far the largest of the season, and at once place it first in the rank of corn receivers, though for the other weeks since navigation opened, down to and including that ending July 8, both Philadelphia and Baltimore surpassed it. In grains of all kinds, New York improved its position materially during the last week, all other places losing.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Raleigh & Augusta Air Line.—Extended from Cameron, N. C., southwest 10 miles.

Covington, Columbus & Black Hills.—The first track is laid for 10 miles from Covington, Neb., westward. It is of 3 ft. 6 in. gauge.

Texas & New Orleans.—Track is laid from Orange, Tex., west 10 miles.

Texas & Pacific.—The *Main Line* is extended from Hayter, Tex., west to Fort Worth, 13 miles. On the *Transcontinental Division* track is laid 25 miles east from Brookston, Tex., and 18 miles west from Texarkana.

This is a total of 86 miles of new railroad, making 932 miles completed in the United States in 1876, against 518 miles reported for the same period in 1875, 727 miles in 1874, and 1,690 in 1873.

LOW GRAIN RATES have been extended to India, where since the famine so great a surplus has been produced that a large amount was exported to England. At a recent meeting of the East Indian Railway Company in London the chairman said: "I dare say that many managers of railways in this country and in other parts of Europe and America would be surprised to hear that we can and do carry at a profit grain at rates varying from ⅝ of a penny to ⅝d. per ton per mile. In fact, we can and do carry coal at a profit for not more than a halfpenny per ton per mile." And again: "But it is because we have carefully, as I said just now, studied the wants of the country, and the extent to which goods of that kind can afford to pay freight over an extended journey of something like 1,000 miles, and have seen our way in what we were about, that we have succeeded in bringing such a very large amount of valuable traffic on our line, and I hope in establishing it as a permanency." However it may be with English and European managers, American railroad men can hardly be much surprised at these figures, amounting to 1¼ to 1⅛ cents in silver (not gold) per ton per mile. If our trunk lines were getting half so much, they would be doing much better than they have done since last April. With the actual rates from 0.40 to 0.44 cents per ton per mile, the wonderfully low rates of the East Indian Railway seem most liberal. Moreover, none of the trunk lines has, for more than a year, received in currency (most of the time worth 6 to 10 per cent. less than the silver which the East Indian gets) more than the lowest grain rates named by the Chairman of that company, and only one has received as much. If the railroads had received 1¼ cents per ton per mile from the grain they have carried from the Northwest to the East since navigation opened, they would have received by this time about $7,500,000, instead of $2,500,000, for their work. We will not maintain that they can carry at a profit at current rates, but they certainly could at the East Indian rates, which by the shortest route would make the New York Chicago rate about 67 cents per 100 lbs.

DISCRIMINATIONS AGAINST SHIPPERS formed the subject of an investigation by a committee of Congress recently, charges being made that the Standard Oil Company, of Cleveland (which has the greatest oil refineries in the world) receives advantages in freights, both from the oil regions to Cleveland for crude and from Cleveland to the East for refined, which no other refiner can get, and that this discrimination tends to give it a monopoly of the oil-refining business. It was not a case of discrimination between localities, such as is often necessary for the most economical conduct of business, and is then advantageous to the community at large; but a discrimination between shippers similarly situated that was charged, the power of making which would give the carrier control over every man's business, and, we may be sure, will not be permitted in this community, if openly practiced, or if discovered when secretly practiced. Charges were made that the leading railroad managers had large interests in the Standard Oil Company, and so were induced to increase their profits by giving it favorable terms and stimulating its business, with no regard to the rights of other shippers, and very little to the interests of their railroad companies. So far as we have seen, no evidence of either change—the fact of discrimination or the interest of managers in the oil company—has been presented, further than the affidavit of some one that he "believed" that railroad managers received a portion of rebates made to the Standard Oil Company as freights, while the Treasurer of the oil company testified that this was absolutely untrue.

THE PERMISSIBLE DISCRIMINATIONS IN RATES TO DIFFERENT SHIPPERS is a subject which deserves a thorough examination. Perhaps the expression should not be used at all, the only permissible discrimination being one between shipments not shippers. Under the same circumstances, one shipper should always get as good rates as another. The difficulty is to decide what "circumstances" justify a reduction in rates, and what proportion of reduction shall be allowed to each. It is the practice to make the rate for car-loads less than that for smaller quantities; but shall there be a further concession for two, three or four car-loads, and if so, how much, and should the reduction be progressive with every additional car shipped? There is more reason, probably, for granting a reduction in consideration of regularity of shipments, the man who ships a car-load a day or three car-loads once a week getting better rates than he who ships a similar quantity only once or occasionally. Often the railroad company can save materially in expenses if permitted to ship at will, as it were, having freight delivered which it is not compelled to forward as early as practicable, but which it may hold for days and perhaps weeks until a light train comes along in the right direction, which can take an addition to its freight with very slight addition to expenses. A reduction might be made in favor of such shipments. There are thus legitimate reasons for discriminations in rates on the same goods over the same routes. What the community is interested in is that no discrimination of this kind should be made except when there is a reduction in expense to the railroad company equivalent to the reduction in rate to the shipper, and, above all, that whatever rates are made should be open to all shippers who will fulfil the conditions on which they are granted.

PRESIDENT JEWETT, of the Erie Railway, made a long and interesting speech at a meeting of the bondholders in London on the 13th inst., a short summary of which was tele-

graphed to this country and published at the time. Mr. Jewett had nothing to propose in the way of reorganization, in addition to what the bondholders' committee have agreed upon, except that he thought that it would be wiser to fund one more coupon of the first consolidated bonds, and he had thought that perhaps a smaller assessment on the stock would produce more money. A large part of the speech (which occupied an hour and a half in the delivery) was devoted to explaining the circumstances which leave this road with so much smaller net earnings than those of its competitors: Mr. Jewett is confident that with the most pressing improvements made (including a third rail to Buffalo) under any ordinary circumstances the road will be a profitable property. "It is a property which, if put into condition, will not only pay the interest upon your bonds beyond all doubt, but be a source of revenue to the stockholders," he said. The purchase of coal lands he thought unwise, but believed that the coal property could be made, in no long time, to return a good interest on its cost. Mr. Jewett was well received; the meeting passed resolutions offering their support and confidence. "They will especially support him in defending the Erie from an unjust competition, and in carrying out the financial plan proposed, in remodeling and restoring the railway." The London railroad papers praise the speech highly, *Herapath's Journal* saying that it was "really one of the best we ever heard at a railway meeting."

PRUSSIAN ROLLING STOCK STANDARDS are described in a paper published on another page. These standards were recently adopted for the Prussian State railroads as the most suitable for their circumstances, after many years' experience. American railroad men who know something of European practice will note in these standards several modifications which tend towards American practice, both in car and locomovive construction. There has been greater variety in railroad practice in Germany than in any other country, perhaps, so that practical experience has been had with many different constructions, and a "natural selection" thus made possible which would have no chance to assert itself in a country where a single uniform system had been used almost from the beginning. The modifications made for the Prussian State railroads, therefore, have more than ordinary significance.

LUMBER has been added to the through rail freights from Lake Michigan to the seaboard—a remarkable movement, for not only is this a material which demands the lowest possible rates of transportation, but the material is so abundant far east of Lake Michigan, in Canada especially, that it was hardly to be expected that any considerable traffic between Lake Michigan and Europe could ever be established. Nevertheless it is reported that a single firm has loaded this season 1,100 car-loads of deals at ports on the east shore of Lake Michigan, and expects to load 2,000 more. Most of these are said to go by the Canada Southern Railway.

JUNE EARNINGS are reported by 28 railroads with 16,504 miles of road—about 22 per cent. of the total in operation in the country—an unusually large proportion, by the way. The result is on the whole favorable, the total earnings being 4.8 per cent., and the earnings per mile 3 per cent. greater this year than last. Nineteen roads show an increase, and nine a decrease.

For the half-year ending with June, 22 roads report, showing on the average the material increase of 7.4 per cent. in earnings per mile.

THE CHARGE FOR TRANSPORTATION is now so low that the Northwestern farmer is about as well situated as one within a hundred miles of New York. The current rates on corn from Chicago to New York by lake and canal, nearly 1,500 miles, is 6¾ cents per bushel, which is just about what a farmer would ask for hauling fifteen miles.

NEW PUBLICATIONS.

Practical Treatise on the Construction of Iron Highway Bridges, for the use of town committees, together with a short essay upon the application of the principles of the lever to a ready analysis of the strains upon the more customary forms of beams and trusses: by A. P. Boller, A. M., Civil Engineer, Member of the American Society of Civil Engineers. New York, 1876, John Wiley & Sons.

At last, after so many volumes of purely theoretical writing on the strains in bridges, we here have a practical book founded on truly scientific principles. We congratulate Mr. Boller that he has known how to lay down in plain language the laws by which the value of a bridge may be judged.

The book mainly is written for the missionary purpose of purging—as far as this is possible by a book—the Augean stable of American highway bridge building. Though expressly dedicated to town, city and county officers and committee men, it has enough substance in it to do good service in many other directions. To those professors of engineering who have almost lost sight of the practical object of bridge building by isolating themselves within a world of imaginary mathematical investigations, Mr. Boller's book will be a very healthy antidote. Young men who have crammed their heads with abstruse algebraic formulæ by this book can be aided to learn what part of theory is really valuable and applicable; and county engineers, city engineers and even railroad engineers will find in it many good hints, the result of many years' practice.

In a very convincing manner the author has treated the qualities of iron and timber, has given a simple method for testing iron, and has set forth why connections with turned pins should be preferred to those made exclusively with rivets. He has pointed out where and in what manner finished work should be examined.

His chapter on iron bridge architecture is very suggestive, and shows that truth and correct proportions form the only proper basis of ornamentation.

The short essay on calculations is exclusively based on the law of the lever, which alone in itself is sufficient to calculate the general strains of any practically valuable construction.

For the calculation of the strains in trusses with curved chords, the author has preferred the method of differences (moments divided by the heights), which in nearly all instances of practical construction is preferable to the method of calculating the strains in *diagonals* as given by Ritter.

Mr. Boller has furnished most valuable hints to honest committee men who wish to guard themselves and their communities against fraud, so commonly perpetrated by one or another of the legion of "tin-pan" bridge-builders that has grown up of late. This he has done by giving forms for invitations to bridge-lettings, by furnishing a form of specification and by stating how a bridge-letting should be conducted. For his meritorious attempt toward raising the standard of American highway bridge building, the author has our best wishes, and he certainly deserves success. A compliment is due to the publisher, also, for increasing the value of the book and at the same time of assisting its mission by presenting it in an attractive form.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Rochester & State Line.—At the annual meeting, recently, the following directors were chosen: George Darling, Edward Harris, Thomas Leighton, George E. Mumford, G. H. Rankin, M. F. Reynolds, Charles F. Smith, Rochester, N. Y.; Oliver Allen, D. McNaughton, Mumford, N. Y.; D. S. Brown, Scottsville, N. Y.; Wm. Bristow, Warsaw, N. Y.; A. D. Scott, Ellicottville, N. Y.; J. Tillinghast, Buffalo, N. Y. The board elected Oliver Allen, President; Edward Harris, Vice-President; Donald McNaughton, Secretary and Treasurer; James E. Child, Engineer and Superintendent.

Chippewa Falls & Northeastern.—The officers of this new company are: President, Thad. C. Pound; Vice-President, L. C. Stanley; Secretary and Treasurer, D. E. Seymour. The office is at Chippewa Falls, Wis.

Pekin, Lincoln & Decatur.—Mr. John S. Cook has been appointed General Manager. He has been for some time General Freight and Ticket Agent of the Peoria, Pekin & Jacksonville.

Hannibal & St Joseph.—Mr. R. S. Stevens, General Manager, will hereafter act as General Superintendent also. Mr. C. N. Lee, late General Superintendent, will remain as Assistant General Superintendent.

Illinois Central.—Mr. W. K. Ackerman, Auditor, has been appointed Vice-President also.

Fort Madison & Northwestern.—At the annual meeting in Fort Madison, Ia., July 19, the following directors were chosen: John C. Atlee, Charles Doerr, John Van Valkenburg, Dr. J. C. Walker, Fort Madison, Ia.; E. Pitkin, Birmington, Ia.; A. L. Courtright, Marion, Ia.; S. W. Pittman, West Point, Ia. Two vacancies were left to be filled hereafter. The board elected John C. Atlee, President; Dr. J. C. Walker, Vice-President, Chas. Doerr, Secretary; A. L. Courtright, Treasurer.

Indianapolis, Cincinnati & Lafayette.—Mr. John Egan, General Passenger Agent, is appointed General Ticket Agent also, in place of F. B. Kennedy, deceased.

Pittsburgh, Cincinnati & St. Louis.—The office of Chief Train Dispatcher of the Indianapolis Division has been consolidated with that of Master of Transportation. Mr. J. W. Finfrock, late Chief Train Dispatcher, retains charge, Mr. J. W. Greunert, Master of Transportation, retiring.

The Indianapolis *Journal* says: "It is understood that on Aug. 1, J. F. Miller, Superintendent of the Indianapolis Division of the Pittsburgh, Cincinnati & St. Louis road, takes the position of Superintendent of the Pittsburgh & Columbus Division. Who is to be his successor on the Indianapolis Division, has not been announced.

Rhode Island Locomotive Works.—Mr. J. Augustus Durgin, late of the Pittsburgh Locomotive Works, is appointed Superintendent.

St. Louis, Keokuk & Northwestern.—Mr. A. L. Griffin has been appointed General Superintendent and General Freight and Ticket Agent, succeeding Mr. Guy Wells in the former, and T. C. Buchanan in the latter position.

Portland & Ogdensburg.—Mr. Albert W. Hastings is appointed Treasurer of the Vermont Division and Mr. Charles H. Stevens General Freight and Passenger Agent of the same division.

Raleigh & Gaston.—At the annual meeting in Raleigh, N. C., July 20, Mr. John M. Robinson was chosen President, with the following directors: Dr. W. J. Hawkins, Paul C. Cameron, W. W. Chamberlain, Joseph B. Batchelor, Walter Clark, Lewis W. Barringer.

Denver, South Park & Pacific.—Mr. Thomas Withers is Engineer in Charge of construction on this road.

PERSONAL.

—Mr. Hardy Eddins, who recently resigned his position as General Superintendent of the Galveston, Harrisburg & San Antonio road on account of ill health, died July 16 at the residence of his mother in Richmond, Va. Mr. Eddins was a native of Richmond, and was still comparatively a young man. He had expected to return to his position on the San Antonio road had he recovered his health.

—Mr. J. P. Farley has resigned his position as President of the Dubuque Southwestern and Secretary and Treasurer of the Dubuque & Sioux City Company. He will devote his entire time to his duties as General Manager of the St. Paul & Pacific.

—Mr. J. T. Odell has resigned his position as Superintendent First Division, Atlantic & Great Western Railroad, and will go to a Western road.

—Mr. J. Augustus Durgin has resigned his position as Superintendent of the Pittsburgh Locomotive Works, and will take charge of the Rhode Island Locomotive Works at Providence.

—Mr. Wm. M. Hastings, General Freight Agent of the Fort Wayne, Jackson & Saginaw Railroad, was recently presented with a valuable gold watch by the officers and employes of the road.

—The Democrats of Missouri have nominated as candidates for Railroad Commissioners John S. Marmaduke, of St. Louis, James H. Harding, of Jefferson City, and John Walker, of Howard County. Messrs. Marmaduke and Walker are members of the present board, and Mr. Harding is a civil engineer of considerable local reputation. Their election is considered certain.

—Mr. Robert H. Berdell, at one time President of the Erie Railroad Company, is under arrest at Goshen, N. Y., on a charge of murder, he having shot and killed a man named Murray, who had attacked him and tried to horsewhip him. The whole affair grew out of some unpleasant family relations.

—Mr. Guy Wells has resigned his position as General Superintendent of the St. Louis, Keokuk & Northwestern road. Mr. T. C. Buchanan also retires from the position of General Freight and Ticket Agent of the same road.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1876–'75.	1875–'74.	Inc. or Dec.		P. c.
Year ending June 30:					
Nashville, Chattanooga & St. Louis	$1,751,600	$1,680,826	Inc..	$70,774	4.2
Expenses	1,023,424	1,151,554	Dec..	128,130	11.2
Net earnings	$728,176	$528,272	Inc..	$199,304	37.7
Earnings per mile	5,122	4,915	Inc..	207	4.2
Per cent. of expenses	58.43	68.53	Dec..	10.10	14.7
Six months ending June 30:	1876.	1875.			
Midland, of Canada	$125,154	$128,537	Dec..	$3,383	2.6
Philadelphia & Erie	1,565,721	1,462,371	Inc..	103,350	7.1
Expenses	1,137,426	1,070,649	Inc..	66,777	6.2
Net earnings	$428,295	$391,722	Inc..	$36,573	9.3
Per cent. of expenses	72.65	73.21	Dec..	0.56	0.8
St. Paul & Sioux City	$261,938	$198,212	Inc..	$63,726	32.0
Expenses	181,587	188,918	Dec..	7,331	3.9
Net earnings	$80,351	$9,294	Inc..	$71,057	764 1
Per cent. of expenses	69.33	95.32	Dec..	25.99	27.3
Sioux City & St. Pau	162,314	104,159	Inc..	58,155	55.8
Expenses	130,214	.....	.....	.....	....
Net earnings	$32,100	.....	.....	.....	....
Per cent. of expenses	80.23	.....	.....	.....	....
Five months ending May 31:					
Atchison, Topeka & Santa Fe	$859,161	$471,239	Inc..	$387,922	82.3
Expenses	422,427	232,283	Inc..	190,144	81.9
Net earnings	$436,734	$238,956	Inc..	197,778	82.8
Per cent. of expenses	49.17	49.27	Dec..	0.10	0.2
Month of April:					
Atlantic, Mississippi & Ohio	$125,976	$159,367	Dec..	$33,391	20.9
Expenses	94,735	88,306	Inc..	6,429	7.3
Net earnings	$31,241	$71,061	Dec..	$39,820	56.0
Per cent. of expenses	75.19	55.19	Inc..	20.00	36 2
Month of May:					
Atchison, Topeka & Santa Fe	$219,370	$107,645	Inc..	$111,725	103.8
Expenses	100,865	49,924	Inc..	50,941	102.1
Net earnings	$118,505	$57,721	Inc..	$60,784	105.3
Per cent. of expenses	45.98	46.38	Dec..	0.40	0.9
Month of June:					
Philadelphia & Erie	$261,265	$287,158	Dec..	$25,893	9.0
Expenses	233,010	229,449	Inc..	3,561	1.6
Net earnings	$28,255	$57,709	Dec..	$29,454	51.0
Per cent. of expenses	89.17	79.90	Inc..	9.27	11.6
First Week in July:					
Cairo & St. Louis	$5,693	.....	.....	.....	....
Denver & Rio Grande, Main Line	6,421	$7,879	Dec..	$1,458	18.5
Denver & Rio Grande, Trinidad Extension	1,769	.....	.....	.....	....
Missouri, Kan. & Texas	30,615	39,463	Dec..	8,848	22.4
Second week in July:					
Atchison, Topeka & Santa Fe	$48,331	$25,984	Inc..	$22,347	86.0
Chicago & Alton	109,190	99,476	Inc..	9,714	9.8
Michigan Central	98,798	112,398	Dec..	13,600	12.1
Missouri, Kan. & Texas	44,451	52,517	Dec..	8,066	15.4
Ohio & Mississippi	51,085	50,345	Inc..	740	1.2
St. Louis, Iron Mt. & Southern	65,100	57,985	Inc..	7,115	12.3
St. Louis, Kansas City & Northern	57,955	37,361	Inc..	20,594	55.1
Week ending June 30:					
Great Western, of Canada	£15,103	£15,018	Inc..	£85	0.6
Week ending July 1:					
Grand Trunk	£37,200	£37,000	Inc	£200	0.5
Week ending July 7:					
Great Western, of Canada	£14,856	£13,872	Inc..	£984	6.6
Week ending July 8:					
Grand Trunk	£33,700	£37,000	Dec..	£3,300	8.9

The decrease is Missouri, Kansas & Texas earnings is attributed to interruption of traffic by wash-outs and the loss of the Red River bridge.

Texas Freight Rates.

The Illinois Central and the Chicago & Alton have adopted the following tariff to points in Texas from Chicago:

Chicago to	First class.	Second class.	Third class.	Fourth class.	Bulk and boxed meats.	Class A.	Class B.
Jefferson and Shreveport	$2.05	$1.70	$1.35	$1.15	$1.05	$0.95	$0 90
Dallas, Denison and Eagle Ford	1.88	1.55	1.25	1.10	1.10	1.00	0.85
Hearne	2.38	2.00	1.71	1.46	1.46	1.25	1.10
Austin	2.63	2.20	1.95	1.65	1.65	1.45	1.18
Kingsbury	2.68	2.17	1.91	1.66	1.56	1.37	1.28

and to other points in proportion. The rates are all per 100 pounds; classes A and B for full car-loads only. There is a general reduction from the former tariff.

Chicago Lumber Traffic.

The *Northwestern Lumberman* reports the receipts and shipments of lumber and shingles at Chicago from Jan. 1 to July 19 as follows (feet of lumber and number of shingles):

Lumber:	1876.	1875.	Decrease.	P. c.
Receipts	402,231,678	452,398,192	50,166,514	11.1
Shipments	254,482,097	278,465,914	23,983,817	8.5
Shingles:				
Receipts	263,783,000	301,762,700	37,979,700	12.6
Shipments	114,470,050	141,971,925	27,501,875	19.0

Of the receipts, 90.8 per cent. was by lake this year and 91.4 last year. Considerable shipments are made by the Illinois and Michigan Canal, but nearly all the rest goes by rail, and forms the leading freight of the railroads which carry grain and stock to Chicago.

California Freights.

The three railroads in the Chicago-Omaha pool have issued the following circular to connecting roads concerning shipments of freight in bond from Atlantic ports through to California.

"Cars loaded with less than 12,000 pounds of freight will not be received.

"Full car-loads of 20,000 pounds should be made up as nearly as practical. When necessary, freight not bonded should be put into the same car to complete the load. All freight in each car must be consigned to the same city. Freight for Sacramento and San Francisco should not be loaded together.

"Cars should be in good order and as nearly new as practicable. Very few old cars can be sent 3,000 miles without trans-

for. They should be of the 4 feet 8½ inch gauge. Adjustable gauge cars will not be taken, as they are unsafe upon the sharp curves met in crossing the mountain ranges."

The impracticability of transferring freight or adding to loads in sealed cars is the occasion of this circular.

Coal Movement.

Coal tonnages for the week ending July 15 are reported as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Anthracite	456,877	559,648	Dec. 102,771	18.4
Semi-bituminous, Broad Top	3,925	.....	.....	....
" " Clearfield	24,230	15,792	Inc. 8,438	53.4
" " Cumberland	46,453	58,916	Dec. 12,463	21.2
Bituminous, Barclay	6,874	7,124	Dec. 250	3.5
" Allegheny Region	3,411	36,518	Dec. 16,970	46.5
" Pittsburgh Region	16,137			

The Anthracite Combination companies have advanced prices 15 cents per ton, the increase to begin Aug. 1.

The coal tonnage of the Pennsylvania Railroad for the six months ending June 30 was as follows:

	Tons.
Anthracite	322,434
Semi-bituminous, Broad Top	83,713
" " Clearfield and Snow Shoe	592,941
" " Cumberland	62,257
Bituminous, Gallitzin and Mountain Region	106,700
" West Penn. Div. and Southwest Penn. Branch	129,462
" Penn and Westmoreland gas coal	394,964
" Pittsburgh Region	153,621
Coke	393,158
Total	2,239,250

Being 208,570 car-loads of 11 tons each, or 6,786 trains of 30 cars each.

Work was this week resumed in the mines of the Delaware, Lackawanna & Western Company and its allied operators in the Scranton Region. The mines will be worked every other week for the present.

Two meetings of the Anthracite Board of Control were held at the office in New York recently to consider the action of the Lehigh Valley Company in shipping some 80,000 tons more than the quota allotted to it in June. At the last meeting it was stated that the Lehigh Valley operators had resolved to reduce their shipments in August enough to make up the June excess, and to abide by the regulations of the combination hereafter. The board resolved to hold regular monthly meetings in New York.

Cincinnati Lumber Traffic.

A large part of the pine lumber received at Cincinnati from Michigan (most of its supply comes from Michigan) arrives by way of Toledo and the old canal, the rates by canal being $2.50 to $2.75 per thousand this year, and the lake rate from Saginaw to Toledo $1.50. The shipments by rail go direct from the the mills, and the rate is usually half a dollar higher than the water rate.

Ocean Freights.

Rates were maintained throughout the week until Tuesday, when they became weaker. Grain from New York to Liverpool has been 8¼d. to 9¼d. by steam, and ¼d. less by sail; to Cork for orders, by sail, about 10d., and a charter from Baltimore is reported at 9¾d. To Liverpool by steam cheese was taken at 50s. to 60s. per ton, bacon at 40s. to 45s., tobacco at 42s. 6d. per hogshead (5s. less by sail). Petroleum rates seem to be higher —6s. 3d. per barrel from New York to a Danish port and the same from Philadelphia to the German Baltic and 6s. 6d. from Baltimore or Richmond to the Baltic; 6s. from New York to Trieste.

The grain exports are comparatively light, and for some weeks grain tonnage is likely to be in little demand on this coast, but much sought for at San Francisco.

Grain Movement.

Receipts and shipments of grain of all kinds for the week ending July 16 are reported as follows, in bushels:

	1876.	1875.	Inc. or Dec.	P. c.
Lake ports' receipts	2,628,445	3,112,134	Dec. 483,689	15 6
Lake ports' shipments	2,877,186	3,418,308	Dec. 541,122	15.9
Atlantic ports' receipts	4,860,451	2,418,673	Inc. 2,411,778	100.2

Of the shipments from lake ports 42⅔ per cent. were by rail this year, against 34½ per cent. in 1875 and 8⅔ in 1874.

Chicago receipts and shipments for the week ending July 25 were:

	1876.	1875.	Decrease.	P. c.
Receipts	1,653,118	1,985,891	332,773	16.7
Shipments	1,581,020	2,235,113	654,093	22.3

These figures are not far from those for the previous week. The movement, it appears, is considerably less than at the same time last year.

Lake and Canal Rates.

The corn rate from Chicago has been reported throughout the week as 1½ cents per bushel. No wheat rates have been reported, the shipments from Chicago being all on "private terms" apparently (three-fourths of its shipments were corn), but rates at Milwaukee have been reported sometimes at 2 cents for wheat. Canal rates from Buffalo to New York have continued lower than ever before, usually 5⅝ cents per bushel for wheat and 5¼ for corn, making, with the elevator charge at Buffalo, a through rate from Chicago to New York harbor of 6¾ cents per bushel on corn. The difference between the New York and Chicago prices is not now more than eight or nine cents.

THE SCRAP HEAP.

Railroad Manufactures.

The works of Dilworth, Porter & Co., at Pittsburgh, Pa., have a capacity of 65 tons of railroad spikes per day. They are fitted with new and improved machinery and the firm claim that, by its use, they can make spikes cheaper and better than any other house has heretofore been able to do.

The Portland Company, at Portland, Me., recently delivered a new passenger engine to the European & North American road.

The King Iron Bridge Company, at Cleveland, O., recently completed a bridge 275 feet long in West Virginia. It has just received a contract for a bridge of four spans, of 150 feet each, over the Juniata River at Lewistown, Pa., besides several smaller Western orders.

The rolling mill and other property of the Blandon Iron Company at Blandon, Pa., were offered for sale by the assignees July 14. No bid was received for the rolling mill, and those made for the other property were so inadequate that they were rejected and the sale adjourned to Aug. 11.

The Wrought Iron Bridge Company, at Canton, O., is running its works 11 hours per day, with 160 men, and has 100 more employed outside in erecting. Bridges are under construction for Ottawa, Canada; Columbus, O.; New Castle, Pa.; Utica, Ill.; Houston, Tex.; Salamanca, N. Y., and other places.

The Wason Car & Foundry Company, of Chattanooga, Tenn., is building some cars for the Northeastern Railroad and some dump cars for the Rising Fawn Iron Company.

The Erie (Pa.) Rolling Mill has been sold by the assignee for $147,600, including the mortgages on the property.

The buildings of the Tennessee Iron & Steel Company, at Chattanooga, are completed, and the machinery is being set up.

The Allentown (Pa.) Rolling Mill started up July 10, and is now busily at work.

The Clinton (Ia.) Bridge Company has just completed several truss bridges for the St. Louis, Bloomfield & Louisville road, and has several contracts for highway bridges on hand.

The Lochiel Iron Works, at Harrisburg, Pa., are supplying the rails for the Emlenton & Shippenville narrow-gauge road.

The Baltimore & Ohio rail mill, at Cumberland, Md., has suspended work for the present. The reason given is that the supply of rails on hand is sufficient for the needs of the road for some time to come.

The car works of H. T. & I. N. Keith, at West Sandwich, Mass., are working full time. They are now getting out stock for an order for 50 platform cars for a road in Nova Scotia.

Mr. George Douglass, manufacturer of locomotive and car springs and forgings, at Bridgeport, Conn., has recently completed an additional shop 65 by 35 feet, and has added to his machinery a 300-pound steam hammer of Ferris & Miles' make, seven fires and three furnaces for railroad springs. He has just finished a large order for Miller draw-hooks for the Long Island road, and is at work on a large one for pump-rods for oil wells.

The Springfield (Ill.) Iron Company has the contract for the rails for the new Waterville & Washington road in Kansas.

The Danforth Locomotive Works, at Paterson, N. J., last week shipped a locomotive to Cuba.

The Thomas Iron Works, at Hokendauqua, Pa., have three of their six furnaces in blast.

The Crane Iron Works, at Catasauqua, Pa., also have three out of six furnaces in blast.

The Lehigh Valley Spike Works, at Allentown, Pa., which were burned some months ago, are now being rebuilt.

The Bradley Manufacturing Company, of Syracuse, N. Y., recently shipped one of its patent cushioned hammers to Sheffield, England. Two out of an order of seven for a shop in Westphalia, Germany, are nearly ready for shipment. The company has recently opened a Western office at No. 22 South Canal street, Chicago.

At the Edgar Thomson Steel Works the seventh Siemens reheating furnace is now being put up.

The Revolving Scraper Company, at Columbus, O., is very busy on orders.

Black, Barneman & Co. have just completed extensive bridge works at Lancaster, O. The works are fitted with the most approved machinery for the construction of iron bridges and have already several orders on hand.

At a meeting of the stockholders of the Wyandotte Rolling Mill Company in Detroit, July 13, the directors were appointed a committee to prepare a plan for relieving the company of existing embarrassments and placing it upon a firm financial basis. The meeting adjourned subject to the call of the board.

The Missouri Car & Foundry Company, at East St. Louis, has its works running full time with about 250 men. Some 40 cars for the Burlington & Northwestern road are under way, besides a good deal of repair work.

Todd & Rafferty, of Paterson, N. J., have nearly ready for shipment eight fireless locomotives for a street railroad in New Orleans. These engines have been designed and their construction superintended by Mr. Theodore Scheffler, of Patterson.

The Pencoyd Iron Works of A. & P. Roberts & Co., in Philadelphia, were established in 1852, and now have three trains of finishing rolls, 12 in., 18 in. and 23 in., and two steam hammers. They make rolled and hammered axles, bridge and shape iron, beams, shafting, etc. They furnished the iron used in the Main Building and Memorial Hall at the Centennial. The works are now employed on the wrought iron for that part of the Philadelphia, Wilmington & Baltimore bridge over the Susquehanna which is being built at the Edge Moor Iron Works; on iron for the Gilbert Elevated road in New York; on a contract for 1,600 hammered axles for the Texas & Pacific, and 800 axles for other roads and car-builders.

Experiments with American Coals.

The National Academy of Science has memorialized Congress for legislation to provide for the continuation of the experiments of the late Prof. Walter R. Johnson on American coals, so as to include the coals of the Mississippi Valley, and the country further west, which now form the fuel of an immense population. Prof. Johnson's experiments give the best information yet attainable of the relative values of the coals which he tried, and similar information of the other coals of the country would be very valuable.

Number of Locomotives on English Railroads.

The following statement is from the *Engineer*: "Of the number of locomotives at work on the English railways no exact estimate has ever been published. It may not be amiss, then, to give from official documents the number of locomotives owned by and at work on some of the chief English railways. The numbers at the end of last year owned by the respective companies were as follows: London & Northwestern, 2,019; Northeastern, 1,331; Midland, 1,196; Lancashire & Yorkshire, 670; Great Northern, 533; Manchester, Sheffield & Lincolnshire, 374; London & Southwestern, 363; London, Brighton & South Coast, 270; Southeastern, 255; London, Chatham & Dover, 142; North Staffordshire, 118; North London, 66; South Devon, 54; Metropolitan, 44; Metropolitan District, 24; Cornwall, 21. This list includes, it is evident, all classes of locomotives, of varying cost, held by the respective companies; but the value is not generally given. It may not be uninteresting to add that on most railways the rate of increase in the number of locomotives has been enlarged within the past few years. In the six years ending with 1875 the stock of locomotives on the London & Northwestern rose from 1,591 to—as we have seen—2,019; similarly the Midland owned at the former period 850, and now owns 1,196; the Northeastern rose from 935 to the total already given; and the Great Western, which had, in 1870, 929, has now about 1,200. This rate of addition seems now to have reached its maximum, as the additions for several of the companies will show. In the six months ending last year the Midland Company added no less than 34 locomotives to its stock, at an apparent cost of above £80,000; the Great Northern added 12, the cost of the addition being £21,000; the Northeastern increased its number by 71, the cost being stated at £171,000; the additions to the Manchester, Sheffield & Lincolnshire numbered 9, and the cost—inclusive of four tenders—was £24,000; and finally, of illustrative examples, the London, Brighton & South Coast added 4, at a cost of £11,000."

From the above figures it will be seen that the prices of locomotives in England during the period named ranged from $13,400 to $8,250 gold, equivalent at the present price of gold to $15,075 and $9,280 in American currency.

RAILROAD LAW.

Directors as Trustees.

In Kelly against the Gilman, Clinton and Springfield Company the Illinois Supreme Court held.

1. It is illegal for directors of a railway company to become members of a company with whom they have made a contract to build and equip the road, so as to share in the profits, and if they do, they will, in equity, be compelled to account for the profits realized.

2. The directors of a railroad company are, in an important sense, regarded as trustees for the stockholders, and it is a breach of duty to transfer the trust, or to assume obligations inconsistent with that relation, or to place themselves in opposition to the interests of the stockholders, or in such a position as that their individual interest will prevent them from acting for the best interests of those they represent.

3. The rule which prohibits a trustee or agent, private or public, from assuming a position tending to produce a conflict between his individual interest and a faithful discharge of his fiduciary duties, is so strict that no question will be allowed to be raised as to the fairness of the transaction, and no actual injury to the *cestue qui trust* need be shown.

4. If a trustee, as a director of a railway company, makes a contract for the building and equipping of the road, and reserves a private interest, or subsequently becomes interested in its execution with a view to participate in the profits of the contract, the *cestui que trust*, or stockholders, may, at their election, ratify the act, and insist upon the advantages of it *in toto*.

5. If the directors of a railway company gratuitously give away certificates of stock, being a major part, thereof, to contractors building the road, for the purpose of giving them a controlling influence in the election of officers and the management of the road, a court of equity will declare the same void, especially where a part of the directors are interested in the contract with the contractors.

6. No ratification of the acts of an agent or trustee will estop the principal or *cestui que trust*, unless he has been made aware of all the material facts and circumstances of the transaction that would in any way influence his mind or affect the transaction.

Maryland Tax on Gross Receipts.

In the recent case of the State of Maryland against the Philadelphia, Wilmington & Baltimore Company, the Court of Appeals sustains the constitutionality of the tax of one-half of 1 per cent. imposed by the amended act of 1874 upon the gross receipts of railroads worked by steam in that State, but at the same time declares that where charter exemptions exist the roads, to such extent as they possess them, are free from the tax. Under this decision the Philadelphia, Wilmington & Baltimore Railroad is made liable to the tax on the gross receipts of its line from Baltimore to the Susquehanna, but not beyond that point, as for the balance of its line, under old charters, it enjoys exemption from all taxes except on its fixed property.

OLD AND NEW ROADS.

Mobile & Ohio.

The Special Master in the foreclosure suit gives notice that, under order of the United States Circuit Court, he is receiving proof of all bonds and other debts which are a charge or lien upon the property, and will continue to do so until Oct. 15. For convenience of bondholders he will be at No. 11 Pine street, New York, from 12 noon to 3 p. m. of every business day from Aug. 7 to Aug. 31; at other times at his office in Mobile, Ala. Bondholders unable to attend in person at Mobile or New York may by correspondence obtain the forms and information necessary to establish their claims.

Denver, South Park & Pacific.

The Denver & San Juan Railroad Construction Company gives notice that bids will be received at its office in Denver, Col., until Aug. 10, for the grading of this road from the mouth of Platte Canon to the South Fork of the Platte, embracing sections 21, 22, 23, 24, 25, 26, 27, 28 and 29. The work will be let in mile sections, and approximate estimates of the quantities given. Bidders will state a price per cubic yard for solid loose rock and earth excavation; also a price per cubic yard (of 25 feet) for culvert masonry, slope and retaining walls and rip raps. Plans, profiles and specifications will be ready for examination by Aug. 1. The work will be paid for monthly in cash.

A correspondent writes as follows: "The Platte Canon is a very large canon and the work in it will be very heavy and difficult. Forty-seven miles are to be built from Morrison (the present terminus), ending at Bailey's Ranche, on the North Fork of South Platte. The canon work will be let first and the rest at such time as will get the whole completed about the same time."

Chicago & Northwestern.

In answer to some questions addressed to him by Marx & Co., of New York, Vice-President Sykes writes as follows:

"We have to say in reply that the accounts which contain the information you desire in respect to gross and net earnings are but just written up for the fiscal year, and the results will in a few weeks appear in the usual annual report of the company.

"Without anticipating that report we proceed to give you such information as bears upon the subject of the security of the consolidated gold loan bonds.

"And first, we answer that the company declines to sell any more bonds. Provision has been made for all steel rails to be laid this summer, and sufficient funds are in hand to liquidate the remnant of the floating debt, which the annual report will show as existing on the 31st of May last.

"The company therefore is now virtually free from the accumulation of floating debt, which for so long a time has absorbed its net earnings and deferred dividends.

"The position which the gold-loan bonds occupy among the securities of the company is substantially that of the second place, and near enough to bed-rock to place them on the most secure foundation.

"The bonds and stocks of the consolidated roads which form the Chicago & Northwestern Railway rank in the following order, beginning at the base of the property and extending upward through its different securities, to wit:

First—Various issues of the original bonds of the consolidated lines, averaging $17,700 per mile	$18,749,500
Second—The consolidated gold loan, averaging $12,000 per mile	12,651,000
Third—Contingent liability for any deficit on proprietary roads, whose whole debt amounts to	16,599,500
Fourth—Preferred stock of C. & N. W. Railway Company	21,502,000
Fifth—Common stock of C. & N. W. Railway Company	15,011,000
Total	$84,513,000

"It will be noticed that the items in the first and second class represent 37½ per cent. of the whole.

"The business of the fiscal year ending on the 31st of May last, will show net earnings on the whole property sufficient to discharge the obligations on all securities included in the first, second and third series above described, together with a surplus extending nearly through the fourth series.

"The net profits are a little over $1,179,000 for the year, the same being about 5⅛ per cent. on the preferred stock."

Texas & Pacific.

The main line was completed to Fort Worth, Tex., July 19, and regular trains began running through July 24. Fort Worth is 25 miles west of the late terminus at Eagle Ford, and 252 miles from Texarkana.

On the Transcontinental Division track is laid from Texarkana west 18 miles. On the western end the track is down to a point 25 miles east of the late terminus at Brookston and 81 miles east of Sherman. Regular trains run to Paris, eight miles east of Brookston. Between the two ends of the track there is a gap of 53 miles, which is being rapidly filled up.

There is considerable agitation in Texas on the subject of the forfeiture of the State land grant to the road. The matter is thus summed up by the Galveston *News*: "The company has for roads constructed received certificates for 4,076,800 acres, which have been located mainly in the smaller reservation.

"The land grant, and the reservation under act of May 2, 1873, were made in lieu of the grant of six million dollars in State bonds, and were subject to certain conditions as follows:

"That the road from Texarkana to Sherman, and the road from Longview to Fort Worth, should both be completed to Fort Worth by the 1st of July, 1874, and failing to complete

either the company to forfeit all rights to their donations and reservations of land.

"By a general act of April 30, 1874, all railroads were allowed an extension of twelve months' time in which to complete the same beyond the time required by their charters. This extended the time of the Texas & Pacific to July 1, 1875.

"By act of March 15, 1875, this company, by special provision, had an extension of time of six months, which gave till Jan. 1, 1876, to complete the road from Brookston to Texarkana and from Longview to Fort Worth.

"By ordinance of the late Constitutional Convention, of date Nov. 23, 1875, the time for the completion of the gaps last mentioned was extended to the close of this session of the Legislature, at which time, without further relief, the company's charter would be forfeited.

"But the general act of March 15, 1875, demands that 20 miles of the road be completed from Brookston *towards* Texarkana, by the 1st of November, 1875.

"This last provision or requirement had not been complied with, and when 23 days after the day this 20 miles were required to be completed, the convention passed its ordinance, it is held by some that the charter and right under it had been forfeited, and the ordinance could not have revived rights and franchises without specially providing for their renewal.

"Now, the company, under a general law, asks for 30 days after the close of this session, in which to complete the road from Texarkana to Sherman, and from Longview to Fort Worth. It is assumed by the company there has been no forfeiture. The question is a doubtful one, but with perhaps a preponderance of authorities in favor of the company.

"If there has been a forfeiture, the general law extending time to all companies would not revive rights so forfeited. So it seems the company rests its rights upon the ground that the 23 days between Nov. 1, 1875, and Nov. 23, 1875, did not work a forfeiture.

"Opponents of the road who want the reservation opened up to settlers and development, say that to pass the bill without declaring the Texas & Pacific reservation forfeited and open to location, is to throw the question into the courts and to keep settlers off for years until the matter is decided, giving the company in the meantime opportunity to complete its lines and to secure its land certificates, and to locate them upon the choice lands along a belt of country extending five hundred miles from Red River to the Rio Grande. They hold that neither the State nor the private parties interested could compete in the courts with Tom Scott, and that it is incumbent upon the State to claim its own by an unmistakable act declaring the reservation opened and the land grant forfeited."

Missouri, Kansas & Texas.

The following circular to agents has been issued: "On and after July 10, 1876, 20,000 pounds of grain and produce will be considered a car-load. Proportionate rates will be charged up to 21,000 pounds. For all over this amount fourth-class tariff rates will be collected."

The temporary bridge to replace that over the Red River which was recently washed away is completed, and trains are now running regularly. All the other damage done by the high water in the Indian Territory has been repaired. Work has been begun on the new permanent bridge at the Red River.

The Machinery Department makes the following statement for May:

	Passenger.	Freight.
Mileage of trains	63,521	85,195
" " cars	277,641	1,192,932
Cost of locomotives per train mile	19.00 cts.	23.30 cts.
" " " car mile	4.36 "	1.66 "
Pounds of coal per car per mile	5	9
Total cost of Machinery Department	$17,654 34	$28,076 82
Total cost of Machinery Department per car hauled one mile	6.3 cts.	2.3 cts.
Cost of car repairs per mile	1.81 "	0.68 "

The cost of switching and work-train engines is charged two-thirds to freight and one-third to passengers. The cost of air-brakes is stated at 2.1 per cent. of passenger-engine repairs and 1.9 per cent. of passenger-car repairs. The cost of Pullman-car repairs was 22.2 per cent. of the passenger-car repairs.

Indianapolis, Bloomington & Western.

The United States Circuit Court in Springfield, Ill., has refused the motion to remand the foreclosure suit to the State courts from which it was recently removed to the Federal court. A motion has been made to vacate the order providing for the payment of back wages and supply bills due. This motion is still pending.

Dividends.

Dividends have been declared by the following companies:

North Pennsylvania, 3 per cent., semi-annual, payable Aug. 1.

Mount Carbon & Port Carbon, 6 per cent., payable on demand.

Mill Creek & Mine Hill, 5 per cent., payable on demand.

Meetings.

The following companies will hold their annual meetings at the times and places given:

Texas & Pacific, at the office, No. 275 South Fourth street, Philadelphia, Aug. 8, at 2 p. m.

Indianapolis, Bloomington & Western, at the office in Urbana, Ill., Sept. 13.

Manchester & Keene.

A sub-contract for 13 miles of the grading has been let to T. F. Maney, of Lewiston, Me., who will begin work at once and employ a large force.

St. Louis, Bloomfield & Louisville.

The Indianapolis *Journal* states that this road has passed into the hands of the Indianapolis Rolling Mill Company, which furnished the iron. Arrangements are being made to operate the completed section of the road.

Sioux City & St. Paul.

The operations for June are reported as follows:

Freight		$22,087 25
Passengers		7,128 32
Other sources		2,672 63
Total earnings ($215 per mile)		$31,888 20
Working expenses (65.9 per cent.)		21,010 44
Net earnings ($73 per mile)		$10,857 76
Rents		74 00
Equipment bond sinking fund		1,231 34
Total		$12,163 10
Debtor balance from previous months	$263 39	
Elevator rents	268 33	
Illinois Central track rent	1,605 00	
Special equipment fund	2,448 00	
State taxes	374 72	
Insurance	200 00	
		5,159 44
Balance, July 1		$7,003 66

For the half-year ending with June the gross earnings were $162,313.54, being an increase of 55.8 per cent. over 1875.

Washington City, Virginia Midland & Great Southern.

The appointment of President Barbour as Receiver in the suit begun last month in the Virginia State Court at Alexandria was noted last week. It seems that this suit, begun by Mr. John C. Graham, either had been or was to be dismissed, but, upon the commencement of another suit in the United States Court by Mr. Scott, a number of the bondholders and other creditors resident in Virginia joined in the Graham suit and the Receiver was appointed. The Graham suit was begun a few days before the Scott suit and now includes, it is claimed, a majority of the creditors and also of the stockholders of the company, so that it is thought probable that the State Court will retain jurisdiction and possession of the road. The objection to the Scott suit appears to have been chiefly in the fact that it has been the general practice of the United States Court in Virginia to appoint a receiver from outside the company interested, and it was desired to keep the road in the hands of the present management.

Northeastern, of Georgia.

Work is now progressing rapidly on this road, and it is expected that the 40 miles from Athens, Ga., northward to a connection with the Atlanta & Richmond Air Line will be completed in September. It is stated that the whole cost of this section will be only $520,000, or $13,000 per mile, of which $240,000 is derived from the State bonds given in aid of the road and the rest from stock subscriptions.

Southern Pacific.

Daylight has been let through the great San Fernando tunnel and in two or three weeks trains will be able to run through. By that time the track from Calienti will have reached the tunnel, completing the rail connection between San Francisco and Los Angeles. The San Fernando tunnel, the last of 18 on the mountain section of the road, is over 7,000 feet long and is the longest in the United States next to the Hoosac tunnel.

A contract has been let for an iron bridge over the Colorado River at Fort Yuma.

Lake Erie, Evansville & Southwestern.

It is said that this company has secured the money to complete its extension from Boonville to Huntingburg, Ind., and that work will soon be resumed.

St. Paul & Sioux City.

This company reports for June as follows:

Freight		$40,647 24
Passengers		10,986 66
Other sources		2,118 67
Total earnings ($441 per mile)		$53,747 57
Working expenses (59 per cent.)		31,615 60
Net earnings ($181 per mile)		$22, 31 97
Rents		95 00
Total		$22,227 97
State taxes	$1,074 95	
Insurance	308 35	
Interest on floating debt	675 01	
		2,058 31
Balance for the month		$20,169 66
Balance from previous month		39,980 01
Balance, July 1		$60,149 67

The gross earnings for the half year ending with June were $261,937.71, being an increase of 32 per cent. over 1875.

Chicago, Danville & Vincennes.

Receiver Anderson reports for May and June as follows:

Balance on hand May 1	$11,622 04
Receipts from current accounts	171,592 60
" former receivers' and company's accounts	293 84
Total	$183,508 48
Disbursements	167,686 54
Balance to July	$15,821 94

The receipts exceeded the disbursements by $4,199.90. The receipts included $121,767.22 on freight and $16,994.84 on passenger account.

Louisville, New Albany & St. Louis.

The suit of Andrew Lewis, of Princeton, Ind., for a balance of some $400,000 claimed to be due him on a contract for the construction of a part of this road, came up in the United States Circuit Court recently and was finally dismissed.

Covington, Columbus & Black Hills.

Tracklaying is now in progress on this road and the iron is down for 10 miles out from Covington, Neb. The iron for the 80 miles from Covington to Ponca is all bought, and the company expects to have that section done by Sept. 1. The road has an exceptional gauge, 3 ft. 6 in.

Atlantic, Mississippi & Ohio.

The Baltimore *Sun* says: "It is stated that the application of the Receivers of the Atlantic, Mississippi & Ohio Railroad to the United States Circuit Court at Richmond, for the privilege of borrowing money with which to pay interest on certain bonds and other purposes, has been withdrawn. This step was deemed expedient because of the opposition of certain parties in interest, who considered the terms of the power asked for too indefinite. It is not known what measures will be taken to relieve the management of the present embarrassment."

Raleigh & Gaston.

Work is in progress on a branch from Warren depot on this road south to Warrenton, N. C., a distance of about seven miles. The grading is more than half done and the rails have been bought.

Sunbury & Lewistown.

It is reported that the present owners of this road have arranged to lease it to the Pennsylvania Railroad Company, which formerly worked it, but abandoned it a year and a half ago.

Atlantic & Great Western.

Hexpath's Journal of July 1 says:

"The total bonds actually deposited with the Trustees, up to the 21st June, are:

1st mortgage	$9,856,425
2d "	6,093,279
3d "	11,507,312

"In January last the deposits were only about a fourth of the above.

"There does not appears to be any doubt that the reconstruction scheme will eventually be successful."

Central Vermont.

The St. Albans *Messenger* gives the following as an outline of the plan of reorganization which the managers of this company are preparing to submit to the security holders:

"They propose to form a new company to own the Vermont Central and Vermont & Canada roads. They will issue $7,000,000 of 6 per cent. 30 years bonds, secured by first mortgage on both roads. They will have $3,000,000 of common stock and $1,000,000 of preferred stock.

"These securities will be divided and offered to old security holders as follows: To the holders of the funded trust debt, (i. e. the Vermont & Canada guaranteed 8s, the equipment loan and the income and extension bonds, but not including the Stanstead, Shefford & Chambly and Missisquoi bonds) about $3,900,000 of first mortgage bonds; to the holders of the floating debt, $1,600,000 of the same; to the Vermont & Canada, $1,500,000 of the same. To the Central Vermont stockholders, $1,000,000 of preferred stock and $700,000 of common stock; to the Vermont Central first mortgage bondholders, $2,000,000 of common stock; to the second mortgage, $300,000 of the same. The new corporation is to pay all debts of the old management not otherwise provided for.

"This, in brief, is the proposition. It proposes to pay the trust debt in full; to pay 66⅔ per cent. at par of the first mortgage bonds without interest, and 20 per cent. of the second mortgage. It proposes to pay 50 per cent. of the Vermont & Canada, without interest, and as the interest in arrears now amounts to upwards of $960,000, it will be seen that unless they treat this interest as a part of the trust debt, (and this is not in the programme,) the Vermont & Canada will get but a pittance of its worth. It should be borne in mind, too, that the offer is not of so much money, or of securities which have a market value; it is of stock and bonds which unitedly represent a capital higher than the roads would now sell for ($11,000,000), and there is a certainty that it would be more than this, under the clause that the new company shall pay all other debts than those above specified. For instance, the foregoing provision for the floating debt is $1,600,000; the actual floating debt, exclusive of all interest claims, is certainly in excess of $2,000,000."

Raleigh & Augusta Air Line.

Work is now progressing rapidly on the extension of this road from Cameron, N. C., to the crossing of the Carolina Central, which will be at Hamlet, seven miles east of Rockingham and 78 from Charlotte. The distance from Cameron to Hamlet is 41 miles, of which 38 miles are graded. Track is laid for 10 miles out from Cameron, and the company expects to have trains running through to Hamlet in September.

Chicago, Pekin & Southwestern.

Heretofore this company's trains have entered Pekin, Ill., on the track of the Indianapolis, Bloomington & Western. On July 16, however, a large force was put at work and a new track laid into the city from the junction, and continued to a connection with the Peoria & Springfield road. No previous notice was given, the company fearing opposition from the Indianapolis, Bloomington & Western and from the city.

Nashville, Chattanooga & St. Louis.

The report for the year ending June 30 is as follows:

	1875-76.	1874-75.	Inc. or Dec.	P.c.
Earnings	$1,751,599 87	$1,680,826 19	Inc. $70,773 68	4.3
Expenses	1,023,423 54	1,151,954 45	Dec. 128,530 91	11.2
Net earnings	$728,176 33	$528,871 74	Inc. $199,304 59	37.7
Interest on bonded debt	438,120 00			
Surplus	$290,056 33			

The earnings this year were $5,122 gross, and $2,129 net per mile; the expenses were 58.43 per cent. of the receipts.

Portland & Ogdensburg—Vermont Division.

The three companies whose roads make up the Vermont Division, the Lamoille Valley, the Essex County and the Montpelier & St. Johnsbury, have all given their consent to the execution of a joint preferred mortgage to supply funds for the completion of the road. It is not stated whether all the holders of the present first mortgage bonds have given their consent, which would appear to be necessary. It is said that work on the road will soon be resumed.

Connecticut Valley.

The Springfield (Mass.) *Union* says: "The managers of the Connecticut Valley Railroad (Saybrook to Hartford) have at last definitely decided to abandon both of its leases—the Connecticut Central (Hartford to the State line) and the Springfield & New London (State line to Springfield). The Connecticut Central will accordingly begin next week running its own line. It owns one engine and a dozen freight cars, and is negotiating for two more locomotives and six passenger cars, already completed, and will increase its freight equipment to 40 or 50 cars. If it is able to lease the New London road, it will run its trains through to Springfield; if not, it will have to stop, of course, at the State line. It has already made arrangements with the Valley road, so that trains will be run through to Saybrook without change of cars, and if the lease of the New London road is effected, the public will be accommodated precisely the same as now. It must be confessed that the action of the Central road leaves the New London road rather out in the cold, even in this hot weather, for it is hardly worth while to buy rolling stock for a road only seven miles long; and it is to be hoped a lease to the Central folks may be arranged on terms advantageous to both sides."

The Illinois Tax Cases.

Springfield (Ill.) dates of July 20 say: "In the United States Circuit Court to-day Judge Davis decided to dissolve the injunctions heretofore issued against the collection of taxes on the capital stock of railroad corporations. The following is a list of the companies which have now to pay State and local taxes for 1873-4: Peoria, Pekin & Jacksonville, Paris & Decatur, Springfield & Northwestern, Chicago, Pekin & Southwestern, Toledo, Wabash & Western, Iron Mountain, Chester & Eastern, Carbondale & Shawneetown, Cairo & Vincennes, Ohio & Mississippi, Cairo & St. Louis, St. Louis & Southeastern, St. Louis, Vandalia & Terre Haute. In all the above cases the restraining orders were set aside and the bills dismissed without prejudice.

"Hon. B. W. Hanna, General Solicitor of the Indianapolis & St. Louis Company, filed a new bill, presenting the question that the Indianapolis & St. Louis Railroad Company is a corporation of Indiana, operating as a leased line the St. Louis, Alton & Terre Haute Railroad. Mr. Hanna founded his bill on the principle settled by the Supreme Court of Illinois in the case of Lieb vs. the Western Union Telegraph Company, 76 Illinois Reports. The question was argued at once, and a perpetual injunction granted.

"It is not known what further steps will be taken by the railroad companies, but their attorneys are still in conference here, and it is probable their line of operations will be developed in a few days."

Green Bay & Minnesota.

The contractors, C. C. Smith & Co., have begun work on the branch which this company is to build from Onalaska, Wis., on the Chicago & Northwestern, to La Crosse, some six or seven miles. There are two deep cuts and a long fill, but the work is to be done by September. In connection with this branch the company will use the Chicago & Northwestern track from Marshland to Onalaska.

The Hoosac Tunnel Line.

The Springfield *Republican* says: "Northern Berkshire realizes its long-delayed ambition in the full opening of the Hoosac tunnel line from Boston to Troy. The Fitchburg Railroad, the only one connecting at the tunnel, realizes its ambition in assuming practical management of the line under the State tolls provided for by the acts of 1875, and unites with the Troy & Boston road to open this competing route to the West. According to the new time-table, three passenger trains are to run, daily, Sundays excepted, between North Adams and Boston, two of them (leaving the Hub at 8 and 11:15 a.m.) connecting at 1 and 5 p. m. at Adams, for Chicago and St. Louis, via Troy; returning, these through trains leave Adams at 9 a. m. and 4:25 p. m. The third passenger train is a special Berkshire and local train, leaving Adams at 5:30 a. m., allowing seven and a half hours in Boston, and reaching Adams again at 11:17 p. m. The extent of the through freight.

ing business attracted by this line, in systematic operation, cannot, of course, be anticipated; but there is likely to be sharp enough competition and bidding by the Hoosac Tunnel and Troy & Boston lines for the favor of western and local freighters to decidedly advantage the public."

Tennessee & Pacific.

Mr. James Price has offered to buy this road and to pay therefor 120 bonds of the State of Tennessee; the $40,000 mortgage bonds now held by the Fourth National Bank of Nashville; the $10,000 floating debt of the company; the $10,600 due the State of Tennessee on the road and $10,000 in new bonds to each of the counties of Davidson and Wilson for their stock in the old company.

Major Thomas O'Connor has also offered to buy the road. No action has been taken on either proposition.

Chicago, Quincy & Western.

This company is trying to secure subscriptions to an amount sufficient to complete the grading of the 42 miles of road from Quincy, Ill., eastward to Beardstown, the terminus of the Springfield Division of the Ohio & Mississippi. It is proposed to take subscriptions and repay them in transportation after the road is completed, subscribers to receive the amount paid by them, with interest, in passenger fares and freight transportation over the road. It is believed that the Ohio & Mississippi company will assist in ironing the road, if the grading is completed.

Waterville & Washington.

The contracts for this extension of the Central Branch, Union Pacific, were awarded as follows: Grading to J. B. Colt, Clinton County, Mo.; bridge building and tracklaying to B. O. Bishop, Quincy, Ill.; rails to the Springfield Iron Company, Springfield, Ill. Work is to be begun this week and finished by Nov. 1. The road will be 21 miles long.

Indianapolis Belt.

Mayor Caven, of Indianapolis, proposes to the City Council that the city build this road. In a long message he argues that it will be a great benefit and a source of revenue to the city. It is to connect all the lines entering Indianapolis by a line around and outside of that city.

Rochester & State Line.

It is understood that Mr. J. Condit Smith, of Buffalo, has given up his contract to complete this road, on account of many unforeseen obstacles which have arisen. At the recent annual meeting, new officers were chosen who are now negotiating with some New York parties for the means to complete the road, and claim to have fair prospects of success.

Illinois Central.

The Illinois Circuit Court has decided that this company's elevator at Cairo trespasses upon the city property and must be removed. The Court also decides that the tracks laid upon some of the public streets of the city must be taken up and the road confined to its own property.

Quebec, Montreal, Ottawa & Occidental.

Under this name is now known the line to be formed by the roads originally known as the North Shore and the Northern Colonization. The line is to extend from Quebec along the north shore of the St. Lawrence to Montreal, thence to Ottawa and beyond, probably to an ultimate connection with the Canadian Pacific. The construction of the line has been undertaken by the Province of Quebec, and the bonds lately offered in London, upon which the *Times* made its recent attack, are the bonds of the Province, issued for the purpose of completing the line. Some work has been done upon both lines, and they had large subscriptions from Quebec, Montreal and other municipalities, all of which have been transferred to the Province, with the unfinished roads.

Dallas & Wichita.

The Dallas (Tex.) *Mail* of July 4 says: "It is generally known to-day was the time set apart to satisfy the judgment against the Dallas & Wichita Railway, by sale of the road, its franchises and effects at United States Marshal's sale, and of course it was generally supposed that the road would pass into other hands. The *Mail* is gratified to announce, however, that the sale did not and will not take place, Dr. J. W. Calder, through Capt. W. W. Orr, having yesterday paid the claim and satisfied the judgment."

Texas & New Orleans.

The work on this road has been much delayed by heavy rains and high water, but is now progressing steadily. There still remain about 10 miles of track to be laid to complete the line from Beaumont, Tex., to Liberty, but the bridge over the Trinity is completed and there is no further obstacle. From the Sabine River at Orange 10 miles of track is laid westward, leaving 14 miles yet to be finished. The bridge over the Neches River at Beaumont is completed. The company hopes to run trains through from Houston to Orange early in September.

Galveston, Harrisburg & San Antonio.

Iron has begun to arrive and the work of laying track from Kingsbury, Tex., westward towards San Antonio has been begun.

Indianapolis, Bloomington & Western.

The Indianapolis *Journal* of July 22 says: "P. M. Arthur, Grand Chief Engineer of the Brotherhood of Locomotive Engineers, yesterday, with a committee appointed by the Indianapolis division to endeavor to reconcile the troubles between the management of the Indianapolis, Bloomintgon & Western road and the engineers on the line, spent several hours with the Receiver, General Superintendent and Master Mechanic of the road, and as a result an adjustment was reached which is satisfactory to both parties. The engineers will accept the reduction of pay, the managers reducing the number of miles constituting a trip, so as to be acceptable to them."

The Erie & Chicago Line.

There is a rumor that this line between New York and Chicago will be broken up and discontinued shortly. It is said that the Baltimore & Ohio, which owns the western end of the line, is not satisfied with the results of its operations.

The Grand Trunk and the Great Western.

It is stated from London that these companies have agreed to refer their differences as to business to competitive points to Mr. Lieman, who is a member of Parliament and Chairman of the Northeastern Railway Company, as arbitrator. The Great Western, however, stipulates that the through tariffs are not to be definitely settled until the present railroad war is ended.

Pacific of Missouri.

The Receivers have discharged nearly all the passenger conductors on the road, and it is reported that traces of extensive frauds have been discovered.

The formal notice of sale under foreclosure sets forth that the whole property, including the main line and Kirkwood Branch and the terminal property in St. Louis, with all the equipment and appurtenances, will be sold in St. Louis, Sept. 6, by Seymour D. Thompson, as Master. The sale will be made subject to all liens prior to the third mortgage and to the claim of St. Louis County against the road. The terms are $200,000 in cash at the time of sale and the balance in cash upon confirmation of the sale, unless the road should be bought for account of the bondholders. In that case the balance may be paid in bonds, but it is provided that 60 days shall be allowed, during which any holder of third-mortgage bonds may join with the purchasers and must be permitted to do so upon equal terms, for the purpose of organizing a new corporation to hold and manage the road.

St. Louis, Lawrence & Western.

A Lawrence (Kan.) dispatch of July 20 says: "A difficulty about taxes has existed for some time between this road and Johnson County. Upon two occasions, recently, the sheriff of Johnson County at Olathe has torn up the track and prevented the passage of trains. His last venture of this kind occurred on Wednesday. The railroad company at once brought suit in the United States Circuit Court and got out a writ of replevin. The writ was served yesterday (Thursday) morning by Deputy United States Marshal Campbell of this city, and by train time yesterday afternoon the track was all in order."

Central Pacific.

Vice-President Huntington has addressed another letter to the Portland (Oregon) Board of Trade with regard to the proposed Oregon connection with his road. He explains some points in his previous letter on the terms upon which the Central Pacific would be willing to build the line, and expresses the opinion that a personal conference would be desirable. On receipt of the letter the Portland Board of Trade passed resolutions requesting the Governor of Oregon to appoint a committee to meet the Portland committee and proceed to San Francisco to consult with the Central Pacific directors as to the terms upon which the road can be secured.

Gilman, Clinton & Springfield.

In the United States Circuit Court in Springfield, Ill., July 17, Mr. E. M. Prince, Master, presented his report upon the exceptions taken to the accounts of Mr. F. E. Hinckley as Receiver. He reports against the allowance of $23,916 claimed by Mr. Hinckley as compensation and commissions and recommends that he be allowed $10,000 in full for compensation, from which should be deducted interest on money used by him. The account as made up by the Master is as follows:

Voucher disallowed	$500 00
Interest on monthly balance	4,360 00
Retained by Receiver as commission	23,916 15
Total	$28,776 25
Credit by compensation allowed	10,000 00
Amount due from Receiver	$18,776 25

The report has yet to be confirmed by the Court.

Philadelphia & Reading.

It is announced that this company has decided to build a grain elevator on its property on the Delaware River in Philadelphia to accommodate the western business coming over the new Erie & Lehigh Valley Line. This business comes to the Reading road over the new extension of the Perkiomen Branch, which strikes the Lehigh Valley near Allentown.

Memphis & Little Rock.

The Receiver is applying the net earnings to the improvement of the road. As fast as possible the track is being laid with new iron rails, with fish joints, and the condition of the road-bed is already much better than it has ever been before.

Hearne, Belton & Western.

It is now said that the Houston & Texas Central Company has offered to build this road from Hearne, Tex., to Belton, 52½ miles, and to begin work at once, provided certain local aid is given. It is thought that this action is taken to prevent the International & Great Northern from securing the road as a feeder.

Carroll & Northwestern.

It is said that the Iowa Railroad Land Company intends soon to begin the construction of a road from the Chicago & Northwestern at Carroll, Ia., west by north to Correctionville in Woodbury County, a distance of about 60 miles. The object would be to bring into market the lands along the line.

Eastern Counties.

A new survey is being made of this proposed line from the Straits of Canso to a connection with the Pictou Branch of the Intercolonian. The engineers report that they have found a much better line than the one formerly run.

Central Branch, Union Pacific.

The suit which has for some time been pending in the New York Supreme Court, in which Mr. S. L. Treadwell sought to recover from S. C. Pomeroy and others a share in the profits of the original contract for the construction of the road, has been settled, the court dismissing the complaint on the ground that no partnership between the parties had been proved.

Toledo, Wabash & Western.

A bill has been filed by counsel for the stockholders in the Illinois Circuit Court at Danville, asking to have the foreclosure and sale of the road set aside on the grounds of fraud and irregularity.

A report that Mr. R. E. Ricker, General Superintendent of the Central Railroad of New Jersey was to be General Manager of the road is denied. Mr. Ricker has recently made an examination of the property for the purchasing bondholders.

Cumberland.

The project is revived of building a narrow-gauge road from Lenaconing, Md., to the Baltimore & Ohio near Cumberland, to serve the coal mines of the Cumberland Region, now dependent upon the Cumberland & Piedmont road for transportation. It is estimated that the road could be built for $750,000, and it is said that responsible contractors have offered to build the road and take the greater part of their pay in its securities.

Worcester & Somerset.

It is said that this road is to be extended this year from its present terminus at Newtown, Md., southeast about 14 miles to the sea shore at Nashville. This line, which was surveyed last fall, is to be the beginning of an extension down the peninsula to Cherrystone, Va.

St. Louis, Iron Mountain & Southern.

The County Court of St. Louis County has finally passed the order permitting this company to build the extension required to carry its trains from the present terminus to the Union Depot in St. Louis. It is to be an elevated road, crossing all the streets on bridges. The order also permits the construction of several sidings to accommodate the freight business of the road and of an inclined plane on the levee near the present freight yards in St. Louis.

Golden, Georgetown & Central.

A company by this name has been organized in Colorado to build a narrow-gauge road from Floyd Hill, the terminus of a branch of the Colorado Central, up Clear Creek to Idaho and Georgetown, with the intention of extending it hereafter through Berthoud Pass into the Middle Park. There is also to be a branch to Central City. A preliminary survey has been made and a small force put at work on the grading. The incorporators are all members of the present board of directors of the Colorado Central Company.

Long Island.

In the suit brought in the New York Supreme Court by F. B. Wallace and John H. Ketchum to restrain this company from completing the leases of the Flushing, North Shore & Central and the Southern roads, a preliminary injunction has been granted, but so far modified as to permit the lessee to work the leased roads and to make the necessary payments for working expenses. The plaintiffs claim that they own a large interest in the Long Island stock and that the leases will depreciate the value thereof; they are unable to do anything, as the Poppenhusens own a controlling interest in all three companies.

The rental to be paid for the Flushing, North Shore & Central is said to be $229,250 for the first year, to increase gradually to $351,050 in the sixth year, at which point it is to remain. For the Southern, the rental is $173,250 for the first year, increasing gradually to $233,450 for the sixth year and thereafter. Both leases are for 99 years.

Pennsylvania.

Sealed proposals will be received at the office of Mr. Wm. H. Brown, Engineer of Maintenance of Way, No. 233 South Fourth street, Philadelphia, until 9 a. m. of July 29 for all the graduation and masonry required to complete the change of line on sections 2, 3 and 4, extending from Eagle Station to Paoli Grove, about three miles. Proposals will be received for each section separately. Plans and specifications can be seen and blank forms obtained at the office.

Chicago, Clinton & Western.

It is proposed to have this road completed to Iowa City by the Receiver, and the Court has been asked to authorize the issue of certificates to the amount necessary to buy and lay the iron. It is said that most of the creditors will consent to the issue.

Eastern.

Notice is given that the mortgage provided for by the agreement with the creditors and legalized by the act of the Massachusetts Legislature has been duly executed and recorded. All creditors of the corporation are notified to present their claims to the company or to the trustees at their office, No. 50 Devonshire street, Boston.

East River Bridge.

The tower and anchorage on the New York side being completed, the work of placing the steel cables which are to carry the bridge will be begun at once. The first work will be to swing two ⅞in. ropes on which will be placed a wooden footbridge on which the workmen can cross and can use in placing the other ropes. The Brooklyn tower and anchorage were completed some time ago.

ANNUAL REPORTS.

Atchison & Nebraska.

This company's road extends from Atchison, Kan., northwest to Lincoln, Neb., 149 miles.

The equipment consists of 10 engines; 6 passenger and 3 baggage and mail cars; 256 freight cars.

The capital account was as follows at the close of the fiscal year, Dec. 31, 1875:

Bonds ($25,168 per mile)	$3,750,000
Unpaid coupons	750,000
Sundry accounts	93,210
Total ($30,827 per mile)	$4,593,210

The work done during the year was as follows:

	1875.	1874.	Decrease.	P. c.
Train mileage	231,763	292,263	60,500	20.7
Passenger mileage	1,058,494	1,656,913	598,419	36.1
Tonnage mileage	7,627,033	10,445,014	2,817,981	27.0

The earnings for the year were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Freight	$180,942	$244,805	Dec. $63,863	26.1
Passengers	46,211	72,168	Dec. 25,957	36.0
Other sources	43,802	36,231	Inc. 7,571	20.9
Total	$270,955	$353,204	Dec. $82,249	23.3
Expenses and taxes	270,683	270,324	Inc. 359	0.1
Net earnings	$272	$82,880	Dec. $82,608	99.6
Gross earn. per mile	1,823	2,376	Dec. 553	23.3
Net " " "	2	587	Dec. 585	99.6
Per cent of expenses	99.88	76.53	Inc. 23.35	30.5

The income account was as follows:

Net earnings	272
County bond coupons paid	22,580
Total	$22,852
Construction	$2,065
Reduction of floating debt	20,787
	22,852

The great reduction in earnings was due mainly to the partial destruction of the crops along the line by grasshoppers. This is shown in a marked way by the decrease in shipments of grain, which was 37.5 per cent., although the area planted was larger than in 1874.

Detroit, Lansing & Lake Michigan.

This company owns a line from Detroit, Mich., west by north to Howard, 164 miles, with branches from Kiddville to Belden, 2 miles, and from Ionia to Stanton, 23 miles, making 189 miles in all.

The capital account at the close of the fiscal year, Dec. 31, 1875, was as follows:

Stock ($8,892 per mile)	$1,680,600
Bonds ($32,032 per mile)	6,054,000
Unpaid coupons	572,040
Bills and accounts payable	268,771
Total ($45,373 per mile)	$8,575,411

The earnings for the year were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Passengers	$215,594	$222,394	Dec.. $6,800	3.1
Freight	495,170	559,671	Dec.. 64,501	11.5
Other sources	28,940	25,632	Inc... 3,308	12.9
Total	$739,704	$807,697	Dec.. $67,993	8.4
Expenses and taxes	528,808	491,407	Inc... 37,401	7.6
Net earnings	$210,896	$316,290	Dec..$105,394	33.3
Gross earnings per mile	3,914	4,274	Dec.. 360	8.4
Net " "	1,115	1,673	Dec.. 558	33.3
Per cent. of expenses	71.49	60.84	Inc... 10.65	17.5

The sum of $13,335 was expended from net earnings for construction and equipment, leaving an available balance of $197,561. The report says: "The gross earnings show a decrease from those of the previous year of $67,993.27, a result of low rates forced upon it by competition—the volume of business being about the same as last year. The charges to construction account have been mainly for new machinery in the shops of the company, fire-proof vault at Ionia, general offices at Detroit, and new water station. The road, including the track and the road-bed, has been kept in good condition, and, on the whole, improved during the year.

"The net earnings during the past two years have been insufficient to provide for the half-coupon interest proposed in the funding plan dated Dec. 15, 1873, and at the same time do justice to the property in the interest of its bondholders. At the close of the last financial year this deficit, with interest, amounted to about $75,000, represented by withheld coupons. The greater portion of this amount has since been paid, but as the spring receipts of the road are always light, no available funds are left applicable at present (April) to payment of coupon interest due April 1, 1876. A notice has been sent to bondholders to that effect. As may be seen from former reports,

basing the net receipts of this year upon the depressed state of trade existing during the past two years, a fair proportion of the interest of the first-mortgage bonds should be earned (applicable to dividends to the bondholders) during the year."

Camden & Atlantic.

This company owns a line from Camden, N. J., southeast to Atlantic City, 60 miles, and leases the May's Landing road, from Egg Harbor City south to May's Landing, 7 miles. It also works a ferry across the Delaware from Camden to Philadelphia.

The equipment consists of 12 engines; 8 first, 19 second and 25 third-class passenger, 2 mail, 2 smoking and 4 baggage cars; 47 box, 68 flat, 3 timber truck and 13 four-wheel lime cars; 1 wrecking car. Six flat cars were built during the year, one new engine bought, three new baggage cars begun and two baggage cars altered to freight or caboose cars. The company owns four horse-cars and 16 mules, used on the track in Atlantic City.

The property is represented as follows:

Common stock	$377,400 00
Preferred stock	838,150 00
Preferred stock scrip	202 40
Total stock ($20,363 per mile)	$1,215,752 40
Bonds ($16,504 per mile)	990,250 65
Bonds and mortgages on real estate	85,900 00
Current accounts	50,267 93
Balance of profit and loss	209,833 70
Total ($42,533 per mile)	$2,552,004 68

The work done, so far as reported, was as follows, for the year ending Dec. 31:

	1875.	1874.	Increase.	P.c.
Train mileage	235,143	219,175	15,968	7.3
Tons freight moved	113,731	112,714	1,017	0.9
Tonnage mileage	2,871,391	.....	.....	..
Passengers carried	502,690	496,997	5,693	0.7

The cost of engine service was 20.91 cents per mile run.

The earnings of the road were as follows:

	1875.	1874.	Inc. or Dec.	P. c.
Passengers	$316,407 12	$314,062 51	Inc.. $2,344 61	0.7
Freight	131,799 58	136,419 58	Dec.. 4,620 00	3.4
Express and mails	41,104 64	27,436 52	Inc.. 13,668 12	49.9
May's Land'g Br'ch	4,216 92	3,601 18	Inc.. 617 74	17.2
Atlantic City horse-cars	7,286 35	.....	Inc.. 7,286 35	...
Rents, etc.	4,959 77	2,922 50	Inc.. 2,037 27	70.1
Ferry	42,716 12	45,444 51	Dec.. 2,728 39	6.0
Total	$548 492 50	$529,886 80	Inc.. $18,605 70	3.5
Working expenses..	$281,246 65	$238,904 87	Inc.. $42,341 78	17.7
May's Land'g Br'ch	7,560 97	7,419 93	Inc.. 141 04	1.9
Horse-car line	2,843 34	.....	Inc.. 2,843 34	...
Ferry	49,199 51	41,814 91	Inc.. 7,384 60	17.7
Total expenses.	$340,850 47	$288,139 71	Inc.. $52,710 76	18.3
Net earnings	$207,642 03	$241,747 09	Dec.. $34,105 06	14.1
Gross earnings per mile	$8,186	$7,909	Inc.. $277	3.5
Net earnings per mile	3,099	3,608	Dec.. 509	18.3
Per ct. of expenses.	62.14	54.38	Inc.. 7.76	14.3

The Main Line earned $8,238 gross and $3,550 net per mile.

The income account for the year is as follows:

Net earnings		$207,642 03
Interest and gold premium	$80,725 40	
Sundry accounts	6,859 27	
Dividends, 7 per cent.	85,088 50	
		172,673 17
Surplus for the year		$34,968 86
Add increase of floating debt		27,169 01
Express team sold		67 50
Total		$62,205 37
Construction, equipment and horse cars	$36,784 97	
Real estate	6,281 93	
Subscription to Centennial stock	5,200 00	
Preferred stock scrip paid	117 18	
		48,384 08
Balance, increase of floating assets		$13,821 29

During the year 1,106 tons new and 207 tons re-rolled iron were laid, 885 tons old rails repaired and relaid and 20,320 new ties put in the track. A new steel crossing was put in at the Pennsylvania crossing in Camden. The track between Absecom and Atlantic City was raised and the road kept in good condition. There were built 3,535 feet new sidings. But 12 miles of the old ∩ rail now remain; 200 tons of steel rails have been laid since the close of the year. A new ferry house and office were built in Philadelphia.

The horse cars in Atlantic City have been profitable; it is recommended that a separate track be built for them, as trains now interfere with their running.

An unusual traffic is expected in the current year, and this anticipation has thus far been fully realized.

The Endurance of Iron Rails.

[A paper read before the American Institute of Mining Engineers by W. E. C. COXE, Superentendent of the Philadelphia & Reading Railroad's Rail Mill, at Reading, Pa.]

In 1857 the Philadelphia & Reading Railroad Company, Reading, made a contract with the Fairmount Rolling Mill for the re-rolling of some 4,000 tons of iron rails. The essential features of the agreement were that the old rails should be piled with puddled iron and rolled into flats for the rail pile, which latter was to be of a section seven inches square, and, after being heated and reduced by rolling to a bloom of a section about five inches by six, was to be reheated before being finished in the rail of the T-pattern. Great care was exercised in the execution of this contract, and the rails, being distributed over all parts of the road, gave general satisfaction by their excellent wear. Five years afterward the principal proprietor and manager of the Fairmount Rolling Mill was elected President of the Reading Railroad, and many of the rails made under his supervision were still in use in the tracks of the company. His first efforts were directed to procuring more rails of the same character. Makers refused to bid because of the details of the specification, mainly because of the price offered not paying for the labor and coal consumed in the changes made necessary by the departure from the established methods of working. Most of the new rails were, therefore, bought, and the old rails rerolled, without regard to any particulars as to the manner of piling, heating, etc., each manufacturer furnishing what he deemed the best article possible for the money.

The result was so unsatisfactory that the company determined in the latter part of 1866 to erect a rolling mill, and manufacture for themselves. As Bessemer steel rails were just beginning to be imported, their future was considered and the mill planned to work steel should it be necessary. Ground was broken at Reading in the spring of 1867, and the first rail turned out in March, 1868.

It was the intention from the inception to make a rail of the very first quality, and, while it was not believed they could be made for any less cost than the market price of an ordinary rail, the profit or gain was in the enhanced endurance of the product. The result has fully justified the wisdom of the policy, and the expenditure for the plant has been more than returned to them directly by the dollars saved in being their own manufacturer instead of purchasing from outsiders, and indirectly, which is of paramount importance; in the longevity of the rail, requiring less frequent renewals of the tracks, and of course, in the expenses for repairs. The nature of the trade being especially destructive to the permanent way.

The mill consists of 12 puddling furnaces with a yearly capacity of 6,500 tons puddled bars; 8 heating furnaces and 2 reheating furnaces capable of furnishing, in the manner hereinafter mentioned, 20,000 gross tons finished rails annually. It is more especially a rerolling mill. The method adopted for making the rails was to work about two-thirds old rails with one-third new or puddled iron. Three pieces of old rails are piled on two layers of puddled iron, and heated and rolled into 3 inches and 4½ inches by 1 inch flats. These form the body of the pile, being piled so as to break joints. The head piece is rolled from a 9 inch square pile of these same flats, heated and rolled into a slab 9 inches wide by 2 inches thick, forming about 22 per cent. of the whole pile. The rail pile thus made up to a section 9 inches square is rolled in three-high 23 inch rolls, until reduced in six passes to a bloom 7 inches wide on the base, 5 inches high and 5 inches wide on the top. The bloom would somewhat naturally assume this shape in course of reduction, but it was more particularly given to distinguish the head part of the bloom from the flange. The bloom is then carried hot to a reheating furnace and wash heated, preparatory to the final rolling, to the finished rail, which is done on a two-high 23-inch train in six passes; a total of 12 passes from the 9 inches pile to the rail 4½ inches high. The use of the puddled iron with the old rails prevents the dryness inherent generally in reworked iron, and insures, with the wash heating, better welds. The bloom is kept in the reheating furnace sufficient time, say 15 minutes, to bring it up to a good welding heat. The bloom going quite hot to the finishing rolls is very completely welded in the first three passes, and as the rolling is done in one direction only, the rolls being two-high, it is believed the cinder is nearly all expelled instead of being retained to some extent, by being chased backward and forward, as would likely be done by rolling in both directions on three-high. After the bloom is thoroughly cemented, the cinder being no longer essential, it is well not to retain it in the rail. It is very evident in the rolling on the two-high train that the rail comes from the last or finishing pass colder than it would if rolled on the three-high rolls, from the fact of more time being required for the rolling, in carrying over the rolls instead of passing through a groove, and thus considerable heat is lost. The colder the rail is rolled in the last few passes the denser and harder will be the metal. In this way an extremely sound rail is obtained, with a good welding surface.

All the rails are stamped with date of laying, and as the rails are not sold, but retained for rerolling, it is easily ascertained what the life has been.

The reports of the President of the railroad, made from year to year, since 1868, shows the life of these rails. Out of 9,000 tons of rails made and laid in 1868, the first year only 4,500 tons, or 50 per cent., had been returned at the end of 1875. Of those made and laid in 1869, 17,000 tons, 4,000 tons or 24 per cent. have been returned. In 1870, 17,500 tons were made, 3,000 tons, or 17 per cent., were worn out, leaving 83 per cent. in use after six years, having carried some 50,000,000 gross tons, inclusive of weight of engines and cars. It should be stated that at the expiration of the year just named, the weight of the rail was increased from 64 to 68 lbs. per yard. The product of 1871 was 19,000 tons, 92 per cent., being still in a good condition, and of the product of 20,000 tons of 1872, only 6¼ per cent. has been worn out under a tonnage of 35,000,000 tons. These tests would seem to show the uniform excellence and durability of the rails turned out by the process described.

Late in 1869 it was decided to make some particular tests of rails manufactured in the usual way, with the exception of leaving the old rails out of the head pieces, and in substituting some special brands of pig iron, worked alone for this purpose. In January, 1870, these were placed where they would be required to carry most of the immense tonnage from the coal regions, and the wear could be carefully noted.

In making these rails a pile was made from muck bar, puddled against soapstone, compressed in the rotary squeezer, and rolled into flats 4½ and 3½ by ¾ inches and piled, breaking joints, 8 inches wide by 5 inches high. This is rolled into flats, 4½ and 3 × 1 inches, and formed into a pile of a section 9 inches square. Some of these piles were rolled flat or horizontally, and others on edge or vertically, into head pieces or tops, 9 inches wide by 2 inches thick. The body of the rail piece is made up of 4½ and 3 × 1 inch flats, rolled from a pile of three pieces of old rails and four pieces puddled iron. The rail pile, thus made up of a section 9 inches square, is rolled into a bloom 7 inches square at base, 4 inches on top and 6 inches high, with the head at the top, and charged into a reheating furnace, and was heated before final rolling in the two-high rolls to the rail section. The rolling of some of the piles for the heads, on edge, so as to bring the welds vertical instead of horizontal in the finished rail, was for the purpose of comparing the two methods. In the horizontal piling most of the failures arise from lamination. The best results followed from the edge rolling. The welds, although vertical in the heads of the finished rails, are in practice rolled horizontal, from the manner of the rail going through the last three passes on its side, the vertical pressure more thoroughly welding the head. Twelve varieties of pig were selected for trial—9 from the Schuylkill Valley, 2 from the Lehigh and 1 from the Susquehanna.

Pieces were taken from the different kinds after being puddled, and once reworked and tested for tensile strength, the maximum being 60,000 lbs. and the mimimum 45,000 lbs. to the inch. They were divided into three classes, the neutral irons, with a tendency to cold-shortness, gave an average of 63,200 lbs., the red-short 60,700, and the cold short 52,500 lbs. These were again arranged in two lots, those with heads rolled flat and those with heads rolled vertical, and the tonnage, including weights of engines and cars actually carried by each kind before it was worn out, was as follows:

	Rails with heads rolled flat.	Rails with heads rolled vertical.
Total average	25,324,348	30,040,670
Red-short average	26,959,308	22,819,300
Neutral average	22,412,593	28,780,361
Cold-short average	26,645,538	33,472,600

From this we gather that the cold-short irons rolled on edge show on an average the most endurance. The parcel of rails doing the best was removed after six years of service, during which time 55,000,000 tons passed over them.

The hard, fine-grained, cold-short irons are more durable than the softer and stronger fibrous irons of a red-short nature. The cold-short irons appear to give the best welds, and the stronger they are the better. The iron in the heads of the rails bearing the maximum tonnage was from a blast furnace in the vicinity of Reading, and was smelted from a mixture of 60 per cent. East Pennsylvania hematites, 25 per cent. Tilly Foster, and 15 per cent. East Run magnetic ores.

The analysis of this head iron gave:

Phosphorus	.422
Silica	.392
Sulphur	.092
Manganese	.164
Carbon	.927
Iron	98.963
	100.000

In the same track with these experimental rails were laid some rails with the heads formed of a solid hammered bloom. These gave a tonnage of 28,000,000 tons; as the iron was too soft from the lack of sufficient rolling they mashed out in spots under the heavy traffic. Puddled steel headed rails have done much better.

While admitting the vast superiority of steel for rails required to stand a very heavy traffic, iron, if carefully selected and properly manufactured, has capacity for which it seldom gets credit.

LOCOMOTIVE RETURNS, APRIL, 1876.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

NAME OF ROAD.	Number of mile operated	Number of Locomotives in service	Mileage. Total	Mileage. Average per Engine	No. Miles run to Ton of Coal	No. Miles run to Cord of Wood	No. Miles run to Pint of Oil	Average No. of freight cars hauled	Average cost pr freight car per mile, cents.	Cost per Mile in Cents for Repairs	Fuel	Stores	Miscellaneous	Engineers, firemen, and wipers	Total	Av. c'st of Coal per ton or bushel	Av. c'st of wood per cord
																$	$
Allegheny Valley (River Division)*	139	40	90,426	2 261	37.50	.....	21.20	16.70	0.732	3 25	3.50	0.73	.....	7.41	14.89	.....	.....
" " (Low Grade Division)*	120	17	34,544	2,032	29 20	.....	19.00	19.90	0.761	9.48	4 48	0.78	.....	6.99	21.73	.....	.....
Atlantic & Great West'n (1st & 2d Div.)	228	82	181,018	2,232	43.51	.....	17.90	.....	.....	4.29	5.08	0.54	0.77	6.31	16.99	2 01	3.21
" " (Third & Fourth Div.)	197	48	103,604	2,158	43.51	.....	20.39	.....	.....	4.13	5 18	0.47	0 87	6 00	16.55	2.01	3.21
" " (Mahoning Division)	83	55	91,671	1.667	43.51	.....	19 51	.....	.....	2.82	5.08	.42	0.61	6 16	15.09	2.01	3.21
Cairo & Vincennes	157	11	23,868	2,170	44 00	.....	16.70	.....	.....	5 16	3.75	0.36	.....	6.15	15 42	1.56	....
Camden & Atlantic	67	13	17 662	1,349	56.39	.....	36 00	.....	.....	6 68	8.75	0.83	.....	5.79	22.05	5.00	....
Cleve., Col., Cin. & Ind.(Col'bus Div.)	138	57	147,668	2,591	46 25	52 80	34.54	.....	.....	2.76	4.31	0.52	.....	7 40	14.99	1.75	3.50
" " " (Indianapolis Div.)	207	63	178.410	2,832	48.28	52.08	28 40	.....	.....	4.63	4.48	0.53	.....	7.37	17.01	1 75	3.50
" " " (Cincinnati Div.)	130	30	77,7 8	2,592	36.12	....	26 20	.....	.....	3.64	5 27	0.54	....	7.26	8.71	1 75	3.50
Cleveland & Pittsburgh*	199	72	137 770	1,913	48 77	.....	22.00	15.70	1.044	2 91	3 95	0 57	2.47	7 13	16 93	1.35	1.65
Cleveland & Mahoning Valley	41	6	16 170	2,695	38.59	.....	9 45	.....	.....	3.64	5.09	0.45	1.05	6 42	16.65	1.82	2.90
Del., Lacka. & West. (Bloomsburg Div.)	80	25	56,839	2 2 3	.....	.....	28.25	.....	.....	6.06	.....	0.58	.....	5.99	12.63	.....	.....
Erie & Pittsburgh*	98	28	48.373	1,728	39.33	.....	17.16	15 .0	1 260	4 32	4.82	0 85	3.20	7.01	20 0	1 50	1.90
Hannibal & St. Joseph	296	54	129 517	2 : 99	38.40	.....	24 20	.....	.....	5.00	4 10	0.40	.....	6.80	16.30	1 50	2.80
Jeffersonville, Madison & Indianapolis*	226	44	84,518	1,92	48.94	25.58	15.73	6.35	1.120	3 59	5 40	0.52	2.79	7.45	19 75	2 60	2.91
Kansas Pacific, Main Line†	673	85	152,503	1,794	33.13	....	12 64	.....	.....	5.63	9.23	0.47	....	7 32	22.65	3 00	3 41
" including all branches†	915	94	171,469	1 835	32.22	....	12.93	.....	.....	5 25	9.40	0.47	....	7 47	2..65	3.00	3.51
Kansas City, St. Jo. & Council Bluffs	334	26	63 946	2, 59	48.30	.....	23.40	17.90	.....	7 50	6 70	0 5	....	2	2 9	3.00	3 50
Lake Shore & Mich. So. (Buff. Div.)§	.....	90	157.14	1,746	36 24	40.50	.....	.....	.....	4.81	11.24	0.63	....	6.38	23 06	4.00	5 99
" " (Erie Div.)§	.....	113	210 454	1,862	45.14	39 67	.....	.....	.....	4 9	7.6	0.38	....	5.94	18.83	3.25	5.43
" " (Toledo Div.)§	.....	83	158,528	1,9 9	39.41	44.84	.....	.....	.....	3.63	8.84	0.47	....	6.08	19.02	3.45	5.18
" " (Mich. So. Div.)§	.....	209	398,964	1 908	35.65	43.06	.....	.....	.....	3 8	11.52	0.42	....	6 38	22.18	4 25	4.63
Leavenworth, Lawrence & Galveston	204	18	23,137	1 285	49.90	.....	36 80	.....	.....	6.9	7.00	0.28	....	5.70	19.88	3.38	2.51
Little Rock & Fort Smith	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marquette, Houghton & Ontonagon	88	18	10,400	577	48.56	.....	17.37	.....	.....	2 63	13.36	0.76	.....	8.08	24.77	.....	....
Missouri, Kansas & Texas‡	786	68	168 750	2 484	34.40	.....	14.30	14.37	1.60	4.58	6.48	0.48	....	6.33	17.87	2.16	....
New York & Oswego Midland	275	25	38,011	1 520	31 20	.....	15.00	.....	.....	4 40	14.90	0.60	.....	7.90	27.80	4.65	....
Northern Central (Elmira & Canan. Div.)	147	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania (New York Division)	12	127	269.452	2 122	36.19	.....	10.99	.....	.....	10.29	18.90	1.20	.....	.....	25.30	4.93	6 64
" (Amboy Division)	154	43	74 210	1,726	57.38	.....	16 18	.....	.....	6.49	8.70	0.80	.....	.....	15 90	4.93	6 66
" (Belvidere Division)	103	36	75,630	2 16	37.90	.....	11.16	.....	.....	5.30	13.20	1.20	.....	.....	19 70	4.93	6.66
" (Philadelphia Division)	191	190	478,559	2,519	30.48	.....	14.37	.....	.....	10.10	5.50	0.80	.....	.....	16 40	1 57	3.92
" (Middle Division)	132	116	289,397	2,495	30.84	.....	19 46	.....	.....	13.90	5.40	0.70	.....	.....	20.0	1.57	3 92
" (Pittsb'gh Div., East End)	.....	71	128,902	1 816	22.46	.....	10.55	.....	.....	18.30	7.30	1.10	.....	.....	26.70	1.57	3.92
" (Pittsb'gh Div.,West End)	.....	120	268 001	2 233	34.47	.....	14.58	.....	.....	10.70	4.80	0.70	.....	.....	16.20	1.57	3.92
" (Tyrone Division)	107	40	65.722	1,643	24 00	.....	21.19	.....	.....	5.90	6.90	0.60	.....	.....	13.40	1.57	3.92
" (West Pennsylvania Div.)	104	21	41. 64	1.965	41.58	.....	3 .23	.....	.....	5 40	4.20	0 40	.....	.....	10.00	1.57	3.94
" (Lewistown Division)	18	2	4,657	2,329	40.33	.....	14.04	.....	.....	0.90	4.20	0.70	.....	.....	5.80	1.57	3.92
" (Bedford Division)	57	4	8,319	2,080	38.54	.....	25.51	.....	.....	1.90	4.40	0.50	.....	.....	6.80	1.57	3.96
Philadelphia, Wilmington & Baltimore	.....	77	153.009	1,987	59.43	.....	12.82	.....	.....	6.59	9.00	1.90	.....	6 90	23.40	4.75	5.08
Pitts., Ft. Wayne & Chi. (East'n Div.)*	371	153	378,132	2.478	42.24	.....	16.48	14.50	1 095	3.68	3.98	0.89	2.01	6.64	17.20	1.66	1.66
" " " (Western Div.)*	280	112	297 707	2,658	41.34	.....	17 66	15.90	1.084	3.08	5.27	0.46	2.43	6.54	17.78	2.18	2.18
Pitts., Cin. & St. L. (Little Miami Div.)*	197	38	89,474	2,355	50.81	.....	12.29	14.58	1.110	5.74	5.50	0.87	2.29	7.05	21.45	2.63	3.00
" " " (Pittsb. & Col. Div.)*	224	89	210 695	2,361	31.08	.....	15.5	17.10	1.210	8 50	4.48	0.89	2.47	7.06	23.40	1.30	3.00
South Carolina	242	35	63,094	1,803	.....	44.40	27.17	.....	.....	3 67	4.63	0.47	.....	.....	8.77	.....	2.05
St. Louis, I. M. & So. (Arkansas Div.)	325	30	64.575	2,153	....	35.00	17.60	.....	.....	3.24	6.34	0.61	.....	7.23	17.42	.....	2.21
Terre Haute & Ind. (Indianapolis Div.)	113	....	63,491	.....	28 60	.....	19.80	.....	.....	8.33	5.82	0 88	.....	8.33	23.26	1.66	....
" " (Vandalia Div.)	158	....	74.732	.....	35.00	.....	22 30	.....	.....	5.50	4.22	0.88	.....	7.53	18.13	1.47	....
West Jersey	128	16	31,280	1,955	47.10	35.34	18.52	.....	.....	7.50	11.50	0.60	.....	.....	19.60	4.70	4.45

* Five empty cars rated as three loaded ones.
‡ Three empty cars rated as two loaded ones.
† Switching and work train engines allowed 60 miles per day.
§ Switching engines allowed 6 miles per hour.